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FLOW IN PROPULSION SYSTEM INLETS

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16. Abstract Computer programs to calculate the incompressible potential flow corrected for compressibility in axisymmetric inlets at arbitrary operating conditions are presented. Included are a statement of the problem to be solved, a description of each of the programs and sufficient documentation, including a test case, to enable a user to run the programs.					
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INTRODUCTION

In the course of designing inlets at the Lewis Research Center, particularly for VTOL and STOL propulsion systems, a calculational procedure utilizing three computer programs evolved (refs. 1 to 4). The chief program is the Douglas axisymmetric potential flow program called EOD which calculates the incompressible potential flow about arbitrary axisymmetric bodies. The other two programs, original with Lewis, are called SCIRCL and COMBYN. Program SCIRCL generates input for EOD from various specified analytical shapes or sets of coordinate points for the inlet components. Program COMBYN takes basic solutions output by EOD and combines them into solutions of interest, and applies a compressibility correction.

These programs have been in a state of continual development over the past few years and in August of 1973 the then-current versions were published in a "Quick Release" form (ref. 5). Since that time all three programs have been sufficiently improved to make the versions of reference 5 obsolete and to warrant the publication of the latest version.

The present paper, then, is an update of reference 5 and consists of a statement of the problem to be solved, a description of each of the programs and sufficient documentation including a test case to enable a user to run the programs. The programs themselves are available from COSMIC, Computer Center, Information Services, 112 Barrow Hall, University of Georgia, Athens, Georgia, 30602. (Program EOD alone is also available through COSMIC with identification number LEW-12387.)

STATEMENT OF THE PROBLEM

The basic problem to be solved is to calculate the compressible potential flow in an arbitrary axisymmetric inlet at any combination of operating conditions of inlet mass flow rate, $\dot{W}$, free stream velocity V_∞ , and inlet incidence angle, α (fig. 1). At nonzero incidence angle the flow in and around the inlet is three-dimensional. At the present time there is not available an exact practical compressible flow method of solution (computer program) capable of handling this inlet problem. Therefore, the problem is solved in several steps (programs):

- (1) Geometry representation (Program SCIRCL)
- (2) Incompressible potential flow basic solutions (EOD)

(3) Combined solutions with compressibility correction (COMBYN)

Each step and its corresponding program will be described in the next section.

DESCRIPTION OF SOLUTION STEPS AND PROGRAMS

Geometry Representation - Program SCIRCL

The inlet is assumed to be axisymmetric and is represented by its meridional profile. This profile is broken into segments at convenient tangent points as shown in figure 2. Each segment may be defined by an analytic expression or a set of points. The inlet duct walls and the outer surface (nacelle or bellmouth) must be extended far downstream (fig. 2) to facilitate obtaining accurate potential flow solutions in the inlet region of interest. The geometry program SCIRCL prepares coordinate-point input for efficient use of the potential flow program and also prints out information such as curvature, wall angles, flow area distribution, etc., which is useful in preliminary screening of proposed inlet shapes. In addition to the surface points, sets of points spanning the passage, like flow measuring rakes, are needed at axial locations where velocity profiles or streamlines are desired. At least one "rake" must be specified for use as a control station. (The function of the control station is given under COMBYN.) Program SCIRCL generates the coordinates of the rake points for input to EOD. Program SCIRCL will also produce Calcomp plots of the inlet geometry and rake points and, optionally, area distribution and curvature distribution (see description of SCIRCL input).

Incompressible Potential Flow Basic Solutions - Program EOD

The Douglas-Neumann program EOD (refs. 6 to 8) is used for calculating the incompressible potential flow. Briefly, the program utilizes a distribution of sources or sinks of initially unknown strength σ to represent the inlet profile. This representation results in an integral equation (see refs. 6 to 8 for details) which is exact for a continuous distribution of source strength. This continuous distribution is approximated by representing the inlet profile by a finite number of discrete elements characterized by a point on the element (e.g., the midpoint) called the control point. Each element has the same predetermined type of source strength distribution (e.g., constant, linear, parabolic). This approximation results in a set of linear algebraic equations that are solved by matrix methods for the source strength at the control points. Velocities at the control points and at specified off-body points (rake points) are then calculated from the source distribution.

Method of approximation. - Two methods of approximation have been used as shown in figure 3: (1) the original method, called the lower order method, which has been in use at NASA-Lewis for several years; and

(2) the improved method, called the higher order method which was recently put into use.

The lower order method (ref. 7) uses flat (linear) surface elements and assumes constant source strength over each element (fig. 3(a)). To obtain solutions of adequate accuracy this method often requires very large numbers of elements and consequent long computer times.

The higher order method (refs. 9 and 10) uses curved (parabolic) surface elements and assumes a linear variation in source strength over each element (fig. 3(b)). For a given accuracy this method requires fewer elements than the lower order method with consequent savings in computer time. Conversely, a greater accuracy can be obtained within the element-number limitations of a given program-computer system with this method.

The program was originally written for closed bodies in a free stream. To apply the method to inlets, the inlets are idealized by adding artificial extensions to the inlet surfaces as shown in figure 2. The method of idealizing conventional inlets is given in reference 11 and that for lift fan or lift engine inlets in reference 2.

Types of basic solutions. - The program is used to obtain three basic solutions which are used in linear combination (to be explained under "Combined Solution, Program COMBYN" below) in order to satisfy the prescribed operating conditions (fig. 1). Two types of sets of basic solutions, as shown in figure 4, have been used at NASA-Lewis. The first is the closed-duct method (in use for several years) and the second is the shroud-vorticity method (recently put into use).

The closed duct method uses a combination of a closed-duct inlet (fig. 4(a)) and an open-duct inlet both in an axial freestream flow to obtain a static arbitrary mass flow. This method has some shortcomings as pointed out in reference 4.

The shroud-vorticity method (fig. 4(b)) utilizes a distribution of unit vortices (in addition to the distribution of sources that represent the inlet profile) on the shroud surface to induce a static mass flow through the inlet. Any arbitrary static mass flow can be obtained by the use of a multiplicative factor. This method does not suffer the shortcomings of the closed-duct method.

Possible solution procedures. - The two methods of approximation and the two methods of inducing static mass flow are independent of each other so that when they are used in all possible combinations there results four different procedures for the solution:

- (1) Higher order approximation - shroud vorticity
- (2) Higher order - closed duct

(3) Lower order - shroud vorticity

(4) Lower order - closed duct

In general, method (1) gives the best accuracy for the fewest points and is therefore the recommended method.

The choice of method of solution is input to program SCIRL and is passed on to EOD. The three basic solutions chosen are output by EOD for use by program COMBYN. No further description of EOD input or output will be given.

Combined Solution - Program COMBYN

This program combines the basic solutions $\bar{V}_j$, $j = 1, 2, 3$ from EOD into any number of solutions of interest. A solution of interest or combined solution $\bar{V}$ is one having specified values of free stream velocity V_∞ and direction α and inlet weight flow $\dot{W}$. The average axial velocity V_c at the control station may be input instead of $\dot{W}$. (If $\dot{W}$ is input, it is converted to V_c since V_c is required by the combination schemes.) Temperature and pressure must also be specified if other than standard conditions are desired. These and other COMBYN inputs are described later. (Note that COMBYN requires α_F rather than α where $\alpha_F = \alpha - 90^\circ$.)

The method of combination of the basic solutions is essentially that given in reference 2 and is illustrated in figure 5. However, the method of calculating the combination coefficients depends on the types of basic solutions, shroud-vorticity or closed-duct, chosen for EOD.

The velocity obtained by combination is incompressible and is corrected for compressibility by the Lieblein-Stockman compressibility correction (ref. 12).

$$V_{\text{cor}} = V_i \left(\frac{\rho_t}{\rho_s} \right)^{V_i/\bar{V}_i}$$

where all the terms on the right hand side are obtained from the incompressible flow solution or the input flow conditions. This correction requires no alteration of the inlet geometry and it can handle local sonic and supersonic velocities. From the compressible velocity, V_{cor} , other flow properties (Mach number, pressure ratio, stream lines, etc.) are obtained.

One of the "rakes" mentioned under SCIRL is used as a control station by COMBYN. The control station is the rake at which the average inlet axial velocity V_c of the combined solution is specified. If there are several rakes any one may be used as the control station. It should be noted, however, that the solution is most accurate in the vicinity of

the control station since the compressibility correction does not exactly satisfy continuity.

Optional supersonic velocity correction. - When the velocity on the inlet surface becomes locally supersonic, the agreement between theory and experiment is generally not as good as when the flow remains subsonic. To improve the agreement an optional supersonic correction based on local streamtube area has been incorporated into the program. This correction affects only the supersonic velocities (and related quantities) on the surface and there will thus be some inconsistency between these corrected surface velocities and the rest of the local supersonic flow field. The supersonic correction is actuated by inputting NX as 1.

Optional force and momentum calculations. - Subroutine INFORC, which is activated by inputting an NX of -1, calculates surface forces and certain integrated quantities at the control station. (See COMBYN OUTPUT.) This subroutine was written for VTOL fan-in-wing and fan-in-pod inlets and therefore the quantities are VTOL oriented.

Thus, under the output heading "SURFACE INTEGRAL," subheading "LIFT" refers to forces in the direction of the inlet axis, positive pointing upstream. "DRAG" refers to forces normal to the LIFT direction, positive in the aft direction when the inlet is oriented vertically ($\alpha_F = 0$).

However, the quantities under the subheading "RESULTANTS" are oriented to the free stream direction and the "ANGLE OF ATTACK" is the ALFAF input to COMBYN. In this group "DRAG" is parallel to the free stream velocity vector, positive pointing downstream, and "LIFT" is perpendicular to the drag.

To illustrate these orientations, consider a conventional inlet at zero angle of attack. ALFAF is -90° . The first group of forces under "LIFT" are actually drag forces and those under "DRAG" are lift forces. However, under RESULTANTS the "LIFT" is lift and the "DRAG" is drag.

Other quantities should be adequately defined under "COMBYN OUTPUT."

When using INFORC at least two THETA's (0 and 180) must be input to COMBYN even when the flow is axisymmetric. When the flow is not axisymmetric more THETA's (say 3 or 5) are desirable.

DESCRIPTION OF SUBROUTINES

Figure 6 illustrates the calling relation between the main programs and their subroutines.

Program SCIRCL

- (A) MAIN SCIRCL Read all input, call required subroutine for each segment as requested, plot each segment after points are generated by subroutine; list points; plot curvature if requested; test for reworking of geometry if requested.
- Straight Lines**
- (B) STRAIT Generate points on a general straight line segment.
- (C) FNSTRH Generate points on final straight segment of a body.
- (D) FRSTSH Generate points on first straight segment of a shroud.
- Ellipses**
- (E) TEST Test superellipse input to see if mirroring about y-axis is required.
- (F) PRELPS Mirror superellipse input data about y-axis so that slope (1,2) is greater than slope (1,4).
- (G) ELIPSE Obsolete (see SUPERC)
- (H) SUPERC Generate points on a general bisuperellipse.
- (I) FONISO Iterate on input conditions to find bisuperellipse exponents.
- Other Curves**
- (J) CUBIC Fit a cubic polynomial between two nonvertical parallel lines.
- (K) SIMQ Simultaneous solution of equations to obtain coefficients of the cubic polynomial.
- (L) LEM Generate points on a general Lemniscate.
- (M) MIRROR Mirror the hub points to obtain the shroud; primarily for 2-D inlets.
- Direct Interpolation**
- (N) XYCALC Executive routine for the following modules; purpose is to generate points "correctly" spaced along the curve defined by the list of input points. Inputs are used to develop double 3-point interpolating

(N) XYCALC (Cont.) polynomials in successive regions along curve. Polynomials are then used to suggest points, derivatives, etc. which can be tested for correct spacing as defined by standard criteria (see comments in SPGEN listing).

(O) SGEN

(P) DZTRP

(Q) SPGEN

(R) DN+RPC

(S) FNTRP

(T) FZTRP

(U) FNTRPC

(V) FNTRPA

(W) TLU

(X) LIMIT

Special Calculations; Output to EOD

(Y) WPUNCH Generate rake points at requested positions; plot rakes; write EOD input flags.

(Z) WRTXY Write remainder of EOD input flags and all X,Y coordinates.

(Z1) AREAA Compute simple disk area (neglecting centerbody) and actual inlet area (including centerbody if any); plot if requested.

Picture Plotting

(Z2) DRAW Plot x-y meridional plane picture of each inlet segment.

(Z3) PLOXIS Plot frames for inlet picture or other required plots; label axes

Utility

(Z4) SINTP Lagrange 3-point interpolation.

(Z5) SORTXY

Rearrange the values in an array, x, to increase with increasing index (ascending order); sort y accordingly.

System Library

ERTRAN

Routine which gives FORTRAN access to several UNIVAC 1110 operating system commands. Can be eliminated by defining unit 25 before execution.

SYMBOL
SCALE
LINE
NUMBER
PLOT

Standard CALCOMP routines needed for all plotting

Program COMBYN

(A) MAIN COMBYN

Executive calls to READS, GETABC, AVEV and, for each clock position, a call to ONOFF; write mass flow, station velocity and circumferential position on unit (4).

(B) READS

Read input parameters from unit (5). Read EOD output coordinates and velocities for the selection of basic flows solved. Plot any 3-D streamlines if required.

(C) CONST

Calculate most constants and intermediate parameters; list results; write on unit (4).

(D) VBARIT

Calculate average density ratio for compressibility correction.

(E) GETABC

Compute linear combination coefficients A, B, C to satisfy input flow conditions.

(F) INTPOL

Interpolate velocities and y-positions at end points of a rake, i.e., where rakes would intercept hub and shroud.

(G) AVEV

Calculate local velocities and densities at all body and rake points. Correct for compressibility; write basic velocities on unit (2) and combined velocities on unit (3).

(H) ONOFF

Call ONBODY and OFFBDY.

- (I) ONBODY Use velocities and densities to: calculate pressure ratios, Mach number, flow angles. List all these for onbody points, plot pressure ratio if desired.
- (J) SRINE Calculate distance along body surface as function of x .
- (K) BEFORC Find all points on hub and shroud that are upstream of XTEST and below YWING. Write x , y , s , pressure ratios and velocities of these points on unit (4) for force calculations.
- (L) OFFBDY Same as ONBODY for rakes. Also, calculate weight flows for various stream tube heights.
- (M) VAROFF Calculate pressure ratios, Mach number, and flow angles for the rake endpoints found in INTPOL.
- (N) NOEPTS Determine number of rake points and endpoints that need to be interpolated by INTPOL to reach body.
- (O) STRML Calculate y -position at each rake for a group of streamlines, separated by weight flow increments of DELQ.
- OFFORC (Entry point in BEFORC) Parallel to BEFORC for all off body points on the control station rake at XTEST.
- (P) INFRCE Integrate pressure ratios along body curves and over all circumferential positions to find lift, drag, and moments.
- (Q) LGRNGE Lagrange interpolation for certain onbody variables at the exact YWING and XTEST positions.
- (R) TRAP Trapezoidal integration
- (S) SINTP See SCIRCL subroutines (duplicate)
- (T) SORTXY See SCIRCL subroutines (duplicate)
- (U) PLOXIS See SCIRCL subroutines (duplicate)

INPUT/OUTPUT UNITS

- SCIRCL: 5 -- standard card input
- 6 -- standard output list

SCIRCL (Cont.) 4 - temporary storage. If flag J or E is 1, input to direct interpolation routines is written here.

17 - Saved. If flag A is 0, input for EOD consisting of X, Y points is written here (6E13.8).

EOD: 5 - input (= 17 from SCIRCL)

6 - standard output list

7 - Saved. Input for COMBYN is written here (4E13.8); X, Y, V_x , V_y , etc.

1-4 } Temporary storage
8-16 }

COMBYN: 5 - standard card input; flow conditions, etc.

6 - standard output list

4 - temporary storage. If NX = -1, data for force calculations are written here.

7 - input (from EOD 7 above)

2,3 - temporary storage

DESCRIPTION OF INPUT AND OUTPUT

SCIRCL Input

Card no.	Format	Col. no.	FORTTRAN name	Description
	9A6	1-54	ARE	= title for area plots. "CROSS-SECTIONAL AREA, SQ. IN."
	9A6	1-54	EX	= title for x-axis. "AXIAL POSITION, IN."
	9A6	1-54	CURVO	= title for curvature plots. "CURVATURE ON SHROUD"
	9A6	1-54	SURFAC	= title for x-axis with surface distance plots. "DISTANCE ALONG SURFACE FROM DOWNSTREAM END OF SHROUD, IN."

These first four cards above will be unchanged for all runs and can be made a part of the execution setup deck, or replaced with data statements.

Card no.	Format	Col. no.	FORTRAN name	Description
1	9A6	1-54	TITLE	Description of case
FOR CALCOMP PLOTTING OF INLET PICTURES				
2	6F10,2	1-10	XX	Length, in plot-inches, of X-axis required
		11-20	XMIN	Value, in data-inches, of far left X-point
			EXEP	Data-inch per plot-inch along X-axis
		31-40	YY	Length in plot-inches, of Y-axis required.
		41-50	YMIN	Value, in data-inches, of bottom Y-point.
		51-60	ORD	Data-inch per plot-inch along Y-axis (usually equal to EXEP)
FOR INFORMATION TO BE PASSED ON TO EOD:				
3	4I1,10X,I1	1	IGEOMF	"Use flat elements (1), use curved (0)"
		2	ISIGF	"Use constant (2), linear (1), or parabolic (0) source densities"
		3	ICURVN	"Read in curvature values (1)"; "EOD will compute curvatures (0)"
		4	NONWF	"Use old velocity formulae (1)"; "New formulae (0)"
		15	IVORT	"Perform axisymmetric, closed-duct soln. (1)"; perform strip vortex soln. (0).
FOR INFORMATION USED BY SCIRCL:				
4	2A6, I4, 2I1, 2I2, 10X, I1, 9X, 3I1, 2I2	1-6	IDENT	6-character tag for case, I.D.
		7-12	PROG	EOD

Card no.	Format	Col. no.	FORTTRAN name	Description
4		13-16	NO6	1 for basic EOD data only 0 for full EOD solution
	(FLAG 'A')	17	LPNCHO	1, Do not save the output for EOD on unit 17
	" B	18	IPLOTA	Plot inlet area against X position
	" C	19-20	IPLOTG	-1, Plot curvature against X +1, Plot curvature against S
<u>ALL FLAGS</u> " D		21-22	IREAD	0 (obsolete)
are 'on' when =1, unless otherwise noted. (Either E or J or neither can be on, but not both)				
	" J	33	IAB	Redo geometry from point (XAA, YAA) to (XBB, YBB)
	" E	43	IREDON (1)	Redo entire geometry via direct interpolation.
	" F	44	IREDON (2)	LPNCHO for any redo.
	" G	45	IREDON (3)	IPLOTA for any redo.
	" H	46-47	IREDON (4)	IPLOTG for any redo.
	" I	48-49	IREDON (5)	IREAD for any redo.
Skip card 5 if J=0				
5	4F12.5	1-12	XAA	X position of starting point for partial redo.
		13-24	YAA	Y position of starting point for partial redo.
		25-36	XBB	X position of ending point for partial redo.
		37-48	YBB	Y position of ending point for partial redo.

Card no.	Format	Col. no.	FORTRAN name	Description
6	5F10.2	1-10	ANBDYS	Number of bodies (can handle 3) =1.0 shroud only =2.0 hub and shroud
		11-20	DELS	Spacing between points in region of interest
		21-30	DELSMX	Maximum spacing far from region of interest
		31-40	XRI	Axial distance at which surface distance equals zero.
7	I4	1-4	NRAKES	Number of axial locations at which data across the passage is desired, must be at least one (for the control station), cannot be greater than 25.
8	3F8.5,I3	1-8	XRAK	Axial location of rake ($XRAK_1 \leq XRAK_{i+1}$).
		9-16	YLO	Y value of first point on the rake at XRAK. If $YLO = 0.0$, the program will calculate a reasonable value for YLO provided the slope of nearby surface is not $>45^\circ$.
		17-24	YHI	Y value of last point on the rake at XRAK. If $YHI = 0.0$, the program will calculate a reasonable value for YHI provided the slope of nearby surface is not $>45^\circ$.
		25-27	NY	Number of points in rake at XRAK. Restriction, $\sum NY \leq 200$
$\Delta Y = \frac{YHI - YLO}{NY}$				
Rake points are equally spaced, ΔY , between YHI and YLO.				
9	2F10.2	1-10	TYPBDY	=1.0 for hub =2.0 for shroud =0.0 if shroud is to be mirror image of hub

Card no.	Format	Col. no.	FORTRAN name
-------------	--------	-------------	--------------

Description

NOTE: A hub-only case (no shroud) can be handled by breaking the hub into at least two segments and inputting the first segment as a hub and the remaining segments as a shroud. This will go through SCIRLE and EOD but not through COMBYN. Examples that might use this option are windmill or turbo-prop hubs.

11-20	ANSEG
-------	-------

= Number of segments for the particular body
 = Y centerline used for mirroring if TYBDY=0
 = 0 for direct interpolation option over the entire body (see cards 11a and 12a input instructions)

10	3F10.2	1-10	ENREED
----	--------	------	--------

Code indicating type of curve to be fitted through given points.

0., for bisuperellipses. See table I and figure 7 for available options. Input 4, 5, or 6 (XIN, YIN) points as directed.

= 1000., same as =0. but with finer point spacing near one end of segment (2 such segments required). Usually used to give finer spacing at the highlight. The superellipse going into the highlight and the one on the topside of the highlight should have this flag.

For bisuperellipses where the '1000' option is to be used, the rate at which the point spacing, ds , changes near one end $ds_i = ds_{i-1} - (\text{rate}) \cdot (ds_{i-1})$ can be specified on input.

The rate (internal name = PACE) is entered as the fractional part of ENREED for each such segment. For example, if ENREED were input as 1000.06, the spacing for consecutive points would be evaluated as follows:

$DS_i = DS_{i-1} - (0.06) DS_{i-1}$ if segment is to go from large-to-small spacing.

Card no.	Format	Col. no.	FORTTRAN name	Description
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or:

$DS_i = DS_{i-1} + 1.5 (0.06) DS_{i-1}$ if
segment is to go from small-to-
large spacing.

If PACE is entered as zero. (i.e.,
ENREED=1000.) The default value,
PACE=.05, will be used.

(PACE $\leq$ 0.133)

*The first '1000' superellipse ON A
BODY reduces the point spacing as
far as possible, down to a limit of
2 percent of the ds value at the be-
ginning of the segment.

*All subsequent '1000' superellipses
input will increase ds as far as
possible up to the input value DELS.

*Any number or types of segments may be
input between the first and subse-
quent '1000' bisuperellipses, with
the exception of a normal bisuper-
ellipse (ENREED = 0.).

= 1, is a straight line, input 2 coor-
dinates (XIN(1), YIN(1), XIN(2),
YIN(2)). (fig. 8(a))

The last straight line on the hub
and the first and last straight
lines on the shroud will automati-
cally have their spacing increased
from approximately DELS near the
region of interest to approximately
DELSMX away from the region of
interest.

The first straight line on the shroud
must be equal in axial length to
the last straight segment on the
hub. (If the actual straight lines
are not equal in length, the longer
should be input as two segments.)

Card no.	Format	Col. no.	FORTTRAN name	Description
				= 10, special straight line used for closed bodies (example - airfoils). This straight line starts with large spacing (DELSMX) and ends with the small spacing (DELS). Input 2 coordinates. (fig. 8(b)). = -1, fits a lemniscate between a straight line and a point. Input is 3 coordinates (fig. 8(c)) = -3, fits a cubic between 2 straight lines, input 4 coordinates (fig. 8(d)) = 99. for direct interpolation option over one segment (see input instructions for card 12, 11a)
		11-20	REEDEN(1)	(See table I) Input exponent of X-term in bisuperellipse equation. Blank for all other segment types.
		21-30	REEDEN(2)	(See table I) Input exponent for Y-term of bisuperellipse.
11	6F12.5	1-72	XIN(I) I=1,2,3,6,4,5	X-coordinates of specified points.
12	6F12.5	1-72	YIN(I) I=1,2,3,6,4,5	Y-coordinates of specified points.
				NOTE: If ENNEED=99.: instead of using cards 11 and 12, input the following cards,
11a	Namelist/\$BODYIN/	Z(I) I=1, up to 300		Z is a complex array containing the X value (in the real part) and Y value (imaginary part) of each given point along the segment. The namelist will normally be longer than one card.
12a	Namelist/\$AUXIN/	DONE		= a logical variable which should be input as = .TRUE.
				NOTE: If ANSEG=0 and TYPBDY $\neq$ 0, skip card No. 10, and substitute 11a for 11 and 12a for 12.

Input deck structure. -

Card no.

1	
2	
3	
4	
5	(only if flag J > 0)
6	
7	
8	} Number of '8' cards = NRAKES
.	
.	
8	
9	
10	} Number of '10-11-12' groups for each '9' card = ANSEG
11	
12	
.	
.	
10	* IF ENREED = 99, on card #10, use #11a instead of 11 and #12a
11	instead of 12.
12	* IF ANSEG = 0, and TYPBDY ≠ 0, on card #9, skip #10 and sub-
	stitute #11a for 11, and #12a for 12.
9	Number of '9' cards = ANBDYS
10	
11	
12	Figure 9 shows a SCIRCL input form, reflecting the above
.	instructions.
.	

SCIRCL Output

Printed output. -

Input file dump (a list of input cards)

Case number and title

Input card number 3 (EOD flags)

Input card number 4 (case I.D. and SCIRCL flags)

Input card number 6 (number of bodies, DELS, DELSMX, and XRI)

Total number of points for all bodies should not exceed 400.
 Total for any one segment of a body should not exceed 200. An
 error message will indicate if these limits have been passed.
 Total number of off-body points must not exceed 200.

Hub segment data, followed by shroud segments. For each segment:

ENREED (as input) and type of segment

Data depending on type of segment

Straight line

X	X(1)	X(2)
Y	Y(1)	Y(2)

Last point data*

Bisuperellipse

Exponents

P	as read in	X	X(1)	X(2)	X(3)	X(6)	X(4)	X(5)
Q	as read in	Y	Y(1)	Y(2)	Y(3)	Y(6)	Y(4)	Y(5)
P	as used	A	XO					
Q	as used	B	YO	OMEGA				

where A & B = Semimajor and minor axes of the transformed superellipse

XO & YO = Center of the transformed superellipse

OMEGA = The difference (in radians) between the slopes of the
 end point slope lines minus $\pi/2$ (i.e., OMEGA is a
 measure of the nonperpendicularity of the slope lines).

Number of iterations**

Iteration data***

Last point data*

'Magic triangle' messages refer to the triangle formed by extending the
 superellipses' slope lines toward each other and drawing a chordline be-
 tween input points number (X₂,Y₂) and (X₄,Y₄). Input points (X₃,Y₃) and
 (X₆,Y₆) must lie within this triangle, or, for certain special cases, may
 lie in a similar triangle on the opposite side of the chordline.

If input points (X₃,Y₃) and/or (X₆,Y₆) fall outside the magic triangle,
 the following message (or messages) is printed:

"This point is below the magic triangle . . ."

or:

"This point is outside the magic triangle . . ."

Cubic

X	X(1)	X(2)	X(3)	X(4)
Y	Y(1)	Y(2)	Y(3)	Y(4)
A	B	C	D	

where A, B, C, and D are the coefficients for the cubic
 $AX^3 + BX^2 + CX = Y$

Number of iterations**
 Iteration data***
 Last point data*

Lemniscate

X	X(1)	X(2)	X(3)
Y	Y(1)	Y(2)	Y(3)
THETMX CALC			ACALC

where

THETMX CALC = angle between line 1-3 and line 1-2

ACALC from equation $R^2 = 2A^2 \sin 2\theta$ where $A = ACALC$,
 $\theta = THETMX$ and $R^2 = (XIN(3) - XIN(2))^2 + (YIN(3) - YIN(2))^2$.

Number of iterations**
 Iteration data***
 Last point data*

* Last point data. This is the coordinate point data for the last point of the segment. It is presented here because it is overwritten by the first point of the following segment and therefore does not appear in the point-by-point array below.

** Number of iterations is the number of iterations required to achieve a satisfactory point spacing for EOD and have the calculated last point of the segment coincide with the input endpoint (to within a prescribed tolerance of 0.1 DELS). If this satisfactory spacing and end-point-matching is not achieved within 150 iterations, the following message is printed out above the number of iterations:

This set of data exceeded 150 iterations. Calculations stopped XBRK YBRK.

X(1), Y(1), X(2), Y(2), X(3), Y(3), X(4), Y(4), X(5), Y(5)

*** Iteration data

DELS IN value of ds at end of previous segment

DELS value used to start final iteration for this segment

DELS OUT value of ds at end of this segment, to be passed on
 to next segment

DSTEST distance from last calculated point to input segment
 endpoint (should be less than .1*DELS; otherwise the
 "exceeds 150 iterations" message is printed)

FINAL PACE the value of PACE at the conclusion (or termination) of
 the point-spacing iteration for bisuperellipses with
 ENREED $\geq$ 1000.

INPUT FOR THE COMBINE PROGRAM NT(1) = NT(2) = NHUEMX = NP =

(See COMBYN input section)

Body coordinates (a separate set for each body; body 3 has only point
number and X and Y)

Point number

X - axial distance

Y - radial distance

KAPPA - curvature

DY/DX - slope

ALPHA - slope angle in degrees

S - surface distance measured from the first point of each body
 (same as SUMDS in EOD output)

S-S(2) - surface distance measured from SRI (same as S in COMBYN output)

DELTAS - distance between points

Rake Information

XRAK - Axial location of rake

YLO - Y value of first location on rake (either read in or computed value)

YHI - Y value of last location on rake (either read in or computed value)

NDY - Number of Y points on the rake, as input

Area Output List

I - point number of each shroud point

XON - axial location of shroud point

YON - Y value of shroud point

YONH - interpolated Y value on the hub at X = XON

AREA - Annular area between hub and shroud (if there is no hub, AREA is the disk area)

DISC AREA - area as if there were no hub

ENSUBK - local curvature parameter =
$$\frac{\text{KAPPA} * (\text{YON} - \text{YONH})}{\sqrt{1 + \frac{\text{YONH}}{\text{YON}}}}$$

File output. - The output file (UNIT #17), written by SCIRCL, is used directly as input to EOD, either as cards or from a mass storage file, depending on how the user has set up UNIT #17. The file is primarily in 6E13.8 format, consisting of the on-body point coordinates and rake points.

Graphic output. - Standard Calcomp paper copies can be produced for each geometry run as follows:

(1) For all cases: an x-y, meridional 'picture' of the inlet with SCIRCL-generated on-body points denoted by the '+' symbol, and connected with straight lines; off-body rake points are denoted by a small square symbol; segment end points have a large octagonal symbol.

(2) For cases with IPLOTA = 1: a graph of cross-sectional area (both disk and annular) against axial distance, X.

(3) For cases with IPLOTG ≠ 0: a graph of shroud body curvature against axial position (IPLOTG = -1) or against distance along shroud. (+1)

COMBYN Input

English engineering units are used throughout the program.

Length - inches
 Velocities - ft/sec
 Angles - degrees
 Pressures - lb/ft²
 Temperature - degrees R
 Densities - slug/ft³
 Force - lbs
 Weight flow - lbs/sec

Card no.	Format	Col. no.	FORTTRAN name	Description
1	12A6	1-72	TITLE	Title card (columns 13-66 are transferred to pressure plots)
2	8I4	1-4	NT(1)	Number of on-body points for the closed-end solution.
		5-8	NP(1)	Total number of off-body points.
		9-12	NT(2)	Number of on-body points for the open-end solution (eliminate the last body).
		13-16	NP(2)	Total number of off-body points
		21-24	KSKIP	=0 for first case of COMBYN =1 for successive cases using the same EOD output.
3	10F8.5	1-8	VC	Average axial velocity at the control station. Based on live flow area, i.e., the flow area minus the area associated with the boundary layer displacement thickness. If WDOT $\neq$ 0, the program will interpret this as a code to ignore the input VC and will calculate VC from WDOT. (To run a case with VC actually equal to zero set WDOT = 0.0 and VC = 0.0.) If ICTLPT (card #5) is not zero, VC is interpreted as the speci-

Card no.	Format	Col. no.	FORTTRAN name	Description
3 (Cont.)				fied pressure ratio (PS/P_T) at a 'control point' rather than a velocity. NOTE: all 3 inputs, WDOT, ICTLPT and VC, must be nonzero when the 'control point' calculation is desired.
		9-16	VINF	Free-stream velocity
		17-24	ALFAF	Angle of attack, 0.0 for free-stream perpendicular to inlet axis. Note that $\alpha_F = \alpha - 90^\circ$. For "control point" cases only, ALFAF will be calculated when ALFAF is input as = 999.0.
		25-32	TTOTAL	Total temperature, if PSTAT and TSTAT are read in (to be explained later), the program will calculate TTOTAL. If TTOTAL = 0 and PSTAT and TSTAT = 0, then TTOTAL = 518.67 will be used.
		33-40	ELND	ELND is the arbitrary length used for scaling or normalizing Refer to KND input, card number 5. See also CUTOFF input below.
		41-48	YWING	Upper limit of integration for surface forces (used in sub-routine INFRCE).
		49-56	UTIP	Rotor tip speed. Need not be input unless relative rotor inlet quantities are desired. (See COMBYN OUTPUT.)
		57-64	VA	Bulk velocity at control station, i.e., average inlet axial velocity based on geometric area. If VA = 0.0, the program will interpret this as a code and set VA = VC.
		65-72	PT	Total pressure. If PT = 0.0 and PSTAT = 0.0, the program will set PT = 2116. If PT = 0.0 and PSTAT $\neq$ 0.0, PT is calculated.

Card no.	Format	Col. no.	FORTRAN name	Description
3 (Cont.)		73-80	CUTOFF	If CUTOFF $\neq$ 0, the pressure ratio P_s/P_t on the shroud will be plotted (on Calcomp) against dimensionless surface distance S/ELND starting at X=XRI and proceeding in both directions along the surface for a distance of S = CUTOFF. Length of plot in paper inches is 10 * (CUTOFF/ELND). There is one plot for each circumferential angle THETA.
4	10F8.5	1-8	PSTAT	Static pressure
		9-16	TSTAT	Static temperature. (If PSTAT and TSTAT are not 0.0, total pressure (PT) and total temperature (TTOTAL) will be calculated using PSTAT and TSTAT.
		17-24	WDOT	Weight flow -- required unless VC $\neq$ 0 and concurrently ICTLPT = 0.
		25-32	DELQ	Increment in mass flow fraction for spacing of calculated streamlines. NOTE: Default Value = 0.1, if D ³ *Q is input as 0.
5	8I4	1-4	NTHETA	Number of THETA's where THETA is the circumferential coordinate. If NTHETA = 0, one THETA (THETA $\leq$ 70°) will be read in and used as the initial angle for the start of 3-dimensional, on-body streamlines. For this option, THETA will vary as the streamline is followed up the shroud instead of remaining a constant on one meridian. NOTE: No INFRCE (force) calculations or pressure plots can be requested when NTHETA = 0.
		5-8	NCLO	One rake must be chosen as the control station. NCLO is the number of the first point on this rake.
		9-12	NCHI	The number of the last point on the control station rake.

Card no.	Format	Col. no.	FORTTRAN	Description
5 (Cont.)		13-16	NX	If $NX = -1$, inlet total force calculations are obtained (Subr. INFRCE). If $NX = +1$, a supersonic velocity correction is activated. At those on-body points where local supersonic flow is detected, velocities and pressure ratios are readjusted based on local Mach numbers and the rate of change of the local velocities. (Since off-body points having supersonic velocity are not corrected, there will be an inconsistency between the corrected on-body points and adjacent off-body points.)
		17-20	KND	Flag for scaling variables before velocity and pressure calculations and also for nondimensionalizing after calculations and just before printout; Scaling: All input lengths and coordinates are divided by ELND immediately after being input, and WDOT is set to $WDOT/ELND^2$. If $KND = -1$, $ELND = YTESTS$ 0, $ELND = 1.0$ (no scaling) +1, $ELND = YTESTS - YTESTH$ +2, $ELND =$ the read-in value from card #3 Nondimensionalizing: If $KND = 8$, the surface distance, S, will be divided by the read-in <u>ELND just prior to printout.</u> If $KND = 9$, the on-body X and Y coordinates will be divided by the read-in <u>ELND just prior to printout.</u> NOTE: If CUTOFF is nonzero, surface distance will automatically be normalized by ELND before printout.
		21-24	NOTHET	If $= 1$, WDOT and VC will be left constant, as input, for all values of THETA (neglecting crossflow term). If $= 0$/blank, WDOT and VC will be corrected for crossflow and will vary with THETA.

Card no.	Format	Col. no.	FORTRAN name	Description
5 (Cont.)		25-28	ICTLPT	Index number (from EOD output) of the desired 'control point' where a known pressure ratio is to be input in lieu of a control station velocity. See VC.
		29-32	ISWIRL	(Required when NTHETA = 0) Index number of point on shroud where 3-D, on-body stream-line calculation will begin; preferably near the fan face.
6	10E8.5	1-80	(THETA(I), I=1,NTHETA) NTHETA $\leq$ 10	Circumferential coordinate in degrees (number of THETA's read in depends on NTHETA)
7	8E10.5	1-10	XTEST	Axial location of control station rake. Must be compatible with NCLO and NCHI.
		11-20	YTESTH	Y on the hub at XTEST (control station)
		21-30	YTESTS	Y on the shroud at XTEST (control station)
8	3E10.5,I4	1-10	XRI	Value of X at which the surface distance is zero.
		11-20	YRIHUB	Y on the hub at XRI.
		21-30	YRISHR	Y on the shroud at XRI.
		31-34	NHUBMX	The number of the last point on the hub (this can be found in the printed output of SCIRCL).

Figure 10 shows a COMBYN input form reflecting the above instructions.

COMBYN Output

Printed output. -

TITLE - COMPRESSIBLE COMBYN APPROACH 5 followed by title on title card.

INLET GEOMETRY I.D. as carried forward from SCIRCLE input.

A list of the basic flow types obtained from EOD, followed by the values of several solution flags used by EOD.

In the table that follows, several functions of three different velocities are given. The velocities are:

Control; VC, Average axial velocity at the control station. (See Input) (The control station is determined by NCLO and NCHI.)

Bulk; VA, bulk velocity at the control station. (See Input)

Free stream, V_{∞} , free stream velocity.

The rest of the table is self-explanatory except perhaps the terms INC and COMP. INC means calculated from incompressible flow equations and COMP means calculated from compressible flow equations.

The rest of the output will be defined by the output name:

ALPHAF	Angle of attack of wing containing VTOL inlet (i.e., the angle between the free stream velocity and a line perpendicular to the inlet axis)
VINF/VC	V_{∞}/V_c
VINF/VA	V_{∞}/V_a
VC/VA	V_c/V_a
VSONIC	Critical velocity uncorrected for compressibility
VSONICC	Critical velocity at control station
WDOTCR	Corrected weight flow = $\frac{WDOT \times \sqrt{THET}}{DEL}$
TSTAT	Free stream static temperature
PSTAT	Free stream incompressible static pressure
PSTATC	Free stream compressible static pressure
ASTAT	Free stream static speed of sound

RHOSTAT	Free stream static density	
WDOT	Input mass flow	
VIC	Incompressible average vleocity at the control station	
TTOTAL	Free stream total temperature	
PTOT	Free stream total pressure incompressible	
PTOTC	Free stream total pressure compressible	
ATOT	Free stream stagnation speed of sound	
RHOTOT	Free stream stagnation density	
THET	$TTOTAL/518.67$	
DEL	$PTOTC/2116.22$	
INDEX	Index of input control point where P_s/P_t is specified	} Appears only if ICTPLT > 0
PRESS. RATIO	The input value of P_s/P_t at the control point	
VCP	Compressible velocity at the control point (calculated from P_s/P_t)	
VBAR	Average axial velocity at the control point station (calculated from WDOT)	
RHOCCP	Compressible density at control point	
XRI	Input	
YRIHUB	Input	
YRISHR	Input	
HUB-TIP RATIO	$YRIHUB/YRISHR$	
LND	Length used for normalizing or scaling (see ELND input instructions)	
XTEST	Input	
YWING	Input	
NT	1 Input 2 Input	

NP	1 & 2, Input
NCLO	Input
NCHI	Input
NHUBMX	Input
NX	Input
KND	Input
KSKIP	Input
NOTHET	Input
ISWIRL	Input
V1	Average (over Y and THETA, where $YTESTH \leq Y \leq YTESTS$ and $0 \leq THETA \leq 360$) axial velocity at the control station for basic EOD solution #1, if $ICTPLT = 0$. If $ICTPLT > 0$, V1 is the resultant velocity at the control point for basic solution #1.
V2	Same as V1 except for basic EOD solution #2.
A,B,C	Coefficients of combination
VINFP	Incompressible free stream velocity "uncorrected" for compressibility from the input compressible value.
THETA	Input
WDOTT	Local weight flow at the circumferential station given by THETA (weight flow that would be obtained if the entire circumferential extent had the same properties as at the local THETA position)
VICT	Local VIC at given THETA (average axial velocity that would result from WDOTT)
V3	Local average (over Y where $YTESTH \leq Y \leq YTESTS$) control station velocity of crossflow basic solution #3 at the given value of THETA, if $ICTPLT = 0$. If $ICTPLT > 0$, V3 is the meridional velocity component at THETA for basic solution #3. Note that in either case, V3 is <u>not</u> like V1 and V2.

OTHER MESSAGES: "VRESON = _____ IS GREATER THAN VMAX. VCONC = _____." The velocity at a certain on-body point exceeds the allowable value for the local expansion condition so that the isentropic ratio term: $1. - VCONC$ is less than zero. Where, $VCONC = \frac{\gamma - 1}{2} \left(\frac{VRESON}{a_{tot}} \right)^2$.

"I EXCEEDS 20 ITERATIONS FOR RHOBAR. VBAR = _____, VCOMP = _____, RHOBAR = _____. VBAR HAS BEEN REDUCED TO $VCOMP * RHOBAR / RHOTOT$ " Subroutine VBARI attempts to find the average density at each axial location using the isentropic density ratio, the stagnation density (RHOTOT) and the average incompressible VBAR (based on weight flow and the cross section). It has failed. VCOMP is the 20th attempt at finding the compressible velocity and has been used to compute the RHOBAR that will be returned. The normally unchanged VBAR is adjusted to agree with these abbreviated results.

For $NX = +1$, supersonic velocity correction is operating and a message to that effect will appear each time a region of local supersonic flow is encountered on the body, and also when it ends. The body point number where these transitions occur will also be printed.

HUB OR SHROUD

ON-BODY POINTS

I	The index number of each on-body point
X	Axial distance
Y	Radial distance
VP	Velocity component tangent to body profile in an X,Y plane (meridional velocity)
VTHETA	Circumferential velocity component
VRES	Resultant velocity $\left(VP^2 + VTHETA^2 \right)^{1/2}$
VBARI	Average incompressible velocity at a given axial location (X) if ISWIRL = 0. If ISWIRL $\neq$ 0, VBARI is replaced with the local value of THETA along the 3-D streamline.
BETA	Flow angle = $\tan^{-1}(VTHETA/VP)$
S	Surface distance from XRI
M	Mach number

RB/RT $\bar{p}_c/\rho_t$ at axial location (X)

PSOPTC Static to total pressure ratio, compressible =

$$\left[1 - 0.2 \left(\frac{V}{a_t} \right)^2 \right]^{3.5}$$

OFF-BODY POINTS (RAKES)

(First Set of Rake Data)

I Number of the off-body point (points without numbers in I column are interpolated points on hub or shroud)

X Axial distance - for each rake

Y Radial distance

VX Axial velocity component V_x

VY Radial velocity component V_y

VZ Circumferential velocity component V_z

VRES Resultant velocity = $\sqrt{V_x^2 + V_y^2 + V_z^2} = V_{res}$

VM Meridional velocity component $\sqrt{V_x^2 + V_y^2} = V_m$

VAFT Velocity component in aft direction = $V_z \sin \theta + V_y \cos \theta$
 (VTOL inlet orientation)

VSPAN Velocity component in spanwise direction
 = $V_y \sin \theta - V_z \cos \theta$ (VTOL inlet orientation)

RH/BR $\bar{p}/\rho_t$

PSOPTC Pressure ratio-compressible

Second Set of Rake Data

$\left. \begin{matrix} I \\ X \\ Y \end{matrix} \right\}$ Same as above

VBRI Average incompressible velocity at a given axial location X

M Mach number

ALPHA Meridional flow angle = $\tan^{-1}(V_y/V_x)$, inlet oriented,
 cylindrical coordinate system.

BETA	Flow angle = $\tan^{-1}(V_z/V_m) = \sin^{-1}(V_z/V_{res})$, inlet oriented, cylindrical coordinate system
ETA	Underturning angle = $\tan^{-1}(V_{aft}/V_x)$, wing oriented rectangular coordinate system for VTOL inlet.
ZETA	Spanwise flow angle = $\tan^{-1}(V_{span}/V_x)$, wing oriented, rectangular coordinate system for VTOL inlet
PHI	Swirl angle = $\tan^{-1}(V_z/V_x)$, inlet oriented, cylindrical coordinate system
QFRACT	Local (at a given x-station) cumulative weight flow between hub or axis and point in question divided by total weight flow at that x-station. If x-station is outside of inlet, control station weight flow is used for total weight flow. (Equivalent to stream function when flow is axisymmetric.)

RELATIVE ROTOR INLET DATA

X	Equal to XTEST
UTIP	Rotor tip speed
Y	Local radius at $X = XTEST$
U	Local rotor speed = $\frac{UTIP * Y}{YTESTS}$ at radius Y

The following quantities relative to a rotor rotating at tip speed = UTIP are calculated at circumferential location THETA.

VZPRIME	Circumferential velocity component relative to rotor = $SIGN * VZ - U$ where $SIGN = SIGN$ of $\sin \theta$
VPRIM	Relative velocity $VM/\cos \beta'$
MPRIME	Relative Mach number = $(V'/a_t) / [1.0 - 0.2(V_{res}/a_t)^2]^{1/2}$
BETAPR	Relative flow angle = $ATAN(V'_z/V'_M)$

The following are the same as above, but calculated at circumferential location 360-THETA.

VZPRST
VPRST
MPRS
BETAPS

RAKE WEIGHT FLOW DATA (based on conditions at the local THETA but using the full circumferential area. Therefore, if $V_{INF} \neq 0$ and $ALFAF \neq -90$, these are not the correct integrated values. The correct integrated value can be obtained by running several THETA's and properly averaging the results.)

I The number of each rake

X Axial location of the rake

$\frac{Q(I)-QBAR}{QBAR}$ Weight flow disparity parameter where $Q(I)$ is integrated weight flow at rake #I and $QBAR$ is integrated weight flow at control station

QSTOT Total weight flow for each rake

QFR Obsolete

QSTOTCR/ARAKE Corrected rake weight flow divided by the flow area at the rake station

MBAR One-dimensional Mach number at rake station based on QSTOTCR/ARAKE

QWALL One-dimensional weight flow at rake station based on conditions at the outer wall (shroud).

QSTOT/QWALL Flow coefficient, $QSTOT + QWALL$

STREAMLINES (See comments above under RAKE WEIGHT FLOW DATA.)

There are streamline data for every rake position, X

QSTRM Value of stream function (increment between streamlines is DELQ)

YSTRM Corresponding y value

Output for optional subroutine INFORC:

CASE Inlet geometry I.D., as carried forward from SCIRCLE input.

YTESTH Input

YTESTS Input

YWING Input

VC	Input
VINF	Input
ALFAF	Input
TTOTAL	Same as TTOT, input
RHOT	Free stream static density as computed from VINF
PA	Obsolete
PAC	Same as PSTATC input
MINF	Mach number based on VINF
MC	Mach number based on VC
NTHETA	Input

SURFACE INTEGRALS

In general, the surface integral quantities are numerical integrals of the local surface static pressure minus the free stream static pressure (PAC). Integration is carried out over ϕ from 0 to 180. (Symmetry is assumed about the $\phi = 0 - 180$ plane; e.g., conditions of $\phi = 270$ are the same as at $\phi = 90$.) Hub integrals go from the control station (XTEST, YTESTH) upstream to the axis; shroud integrals go from the control station (XTEST, YTESTS) upstream to the input value YWING.

TOTAL FORCE, LIFT, and DRAG differ in the area element used in the integration: TOTAL FORCE uses the actual surface area element; LIFT FORCE uses the component (or projection) of that element normal to the lift direction (see section "Optional Force and Moment Calculations"); DRAG FORCE uses the area component normal to the drag direction. LIFT and DRAG MOMENT's are the integral of the appropriate differential force (lift or drag) times the distance from the area element to the origin. MOM. ARM is the moment arm, i.e., the distance from the center of moments (origin) to the point where the entire lift or drag force would act to produce the given moment.

AREA is the integrated area over which the force integrations are carried out.

RESULTANTS are the force components in a coordinate system where the lift direction is perpendicular to the free stream velocity vector and the drag direction is parallel to the free stream.

ANGLE OF ATTACK is the ALFAF input.

MEASURING STATION INTEGRALS

X = XTEST input

These integrals are carried out over the flow area at the control station.

AREA

INT

Numerically integrated annular area between hub and shroud over which the various quantities are integrated.

EXACT

Annular area between hub and shroud calculated from hub and shroud radii. (Used as a check on the accuracy of the numerical integration.)

FORCE DUE
TO PRESSURE

Integral of local static pressure at control station minus free stream static.

WEIGHT FLOW

Integrated weight flow

MOMENTUM FLUX

Integrated momentum flux

MOMENT OF
MOMENTUM FLUX

Integrated moment of momentum flux about the inlet axis

DRAG FLUX

Integrated aft-directed momentum flux. (May be clarified by definition of AVERAGE VAFT following.)

AVERAGE VAFT

Integrated average of the local VAFT at the control station. Obtained from DRAG FLUX divided by WEIGHT FLOW.

VIN/VC

VIN divided by VC.

(VIN - VAFTAV)/VC

Obsolete

(VIN - VAFTAC)/VC

(VIN - AVERAGE VAFT) divided by VC

D/L

Obsolete

DC/LC

RESULTANT DRAG divided by RESULTANT LIFT

MISALIGNMENT PARAMETERS

DELV

Obsolete

DELVC

arctan (AVERAGE VAFT divided by VC)

DELM

Obsolete

DELMC

arctan (DRAG FLUX divided by MOMENTUM FLUX)

COMPARISONS	The two lines of output listed under this heading are obsolete.
LIFT	Obsolete
LIFTC	$\left(\frac{\text{WEIGHT FLOW}}{g} \times VC - \frac{\text{FORCE DUE}}{\text{TO PRESS}} \right) \times \cos \text{ALFAF}$
DRAGP	Obsolete
DRAGPC	$\frac{\text{WEIGHT FLOW}}{g} (VC \sin \text{ALFAF} + \text{VINF}) - \frac{\text{FORCE DUE}}{\text{TO PRESS}} \sin \text{ALFAF}$
DRAG	Obsolete
DRAGC	$\text{DRAGPC} - \text{DRAG FLUX} \cos \text{ALFAF}$

Graphic output. - Standard Calcomp plots can be produced for a COMBYN case/run as follows:

(1) For each case with CUTOFF $\neq 0$, a plot of onbody static pressure ratio, P_s/P_t , against normalized surface distance on shroud, S/ELND (see CUTOFF, card #3). Two curves appear on each plot, one for points upstream from $S = 0$ and one for those downstream, toward fan. If $S = 0$ at the highlight, then one curve gives the internal pressure distribution and the other gives the external. One plot will be produced for each value of THETA read in from card #6.

or:

(2) (Not compatible with (1)) For each run (i.e., 1 or more cases, back to back), whose last case has set NTHETA = 0, a plot of the now-dependent variable THETA against axial position along a 3-D streamline. One curve is shown for each separate case of 'NTHETA = 0' included in the run.

NOTE: The highlight of the shroud should be at $X = 0$, in order to use this option. For purposes of display only, points on exterior of shroud (past highlight) are plotted with negative X positions.

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TABLE I. - BISUPERELLIPSE INPUT OPTIONS

[To fit a bisuperellipse, $(X/A)^P + (Y/B)^Q = 1$ between two given points (XIN(2), YIN(2)) and (XIN(4), YIN(4)), tangent (except case f) to the specified endlines (lines 1 + 2 and 4 + 5)*, and satisfying the additional listed conditions, set the input as indicated. (Do not input P, Q, or N as 1.0.)]

Fig. 7	Given condition(s):	Input the following:					
		REEDEN		XIN(3)	YIN(3)	XIN(6)	YIN(6)
		(1)	(2)				
a	One point (X_3, Y_3) (Superellipse)			X_3	Y_3		
b	One exponent, N ($P = Q = N$) (Superellipse)	N	N				
b	Two exponents, P and Q	P	Q				
c	One exponent P and one point (X_3, Y_3)	P		X_3	Y_3		
c	One exponent Q and one point (X_3, Y_3)		Q	X_3	Y_3		
d	Two points (X_3, Y_3) and (X_6, Y_6)			X_3	Y_3	X_6	Y_6
e	One point (X_3, Y_3) and its slope $(dy/dx)_3$			X_3	Y_3	$(dy/dx)_3$	-100.
f	X-location of inflection point X_3 and its slope $(dy/dx)_3^{**}$			X_3	+100.	$(dy/dx)_3$	-100.
g	Curvature CAP at an endpoint (X_E, Y_E) where (X_E, Y_E) may be either (XIN(2), YIN(2)) or (XIN(4), YIN(4)).***			X_E	Y_E	CAP	200.
h	Curvature at end point (XIN(2), YIN(2)) is to be set equal to curvature at last point of previous segment***			XIN(2)	YIN(2)	999.	200.

*In general, lines 1 + 2 and 4 + 5 need not be orthogonal (fig. 7). If they are not, the bisuperellipse equation is $\left(\frac{X' + Y' \tan w}{A}\right)^P + \left(\frac{Y'}{B}\right)^Q = 1$, where $Y' = Y$ and $X' = X + Y \tan w$ and w is the angle of deviation from orthogonality. The angle w may be positive or negative depending on whether the angle β (fig. 7(a)) between lines 1 + 2 and 4 + 5 is acute or obtuse, respectively ($w = 90 - \beta$).

**For this option: (1) no shear transformation is allowed, i.e., the endlines 1 + 2 and 4 + 5 must be orthogonal; (2) one endline must be horizontal; (3) only one endline is tangent to the curve; the other endline is orthogonal to the curve. See figure 7(f) for detailed restrictions. In general, a bisuperellipse will have an inflection if either P or Q is less than 1 and the other is greater than 1.

***For curvature options: (1) no shear transformations are allowed; (2) desired curvature, whether via input CAP (g) or previous segment (h), cannot be zero or infinite; (3) for curvature matching option (h) the slope angle at the curvature match endpoint cannot be 90° unless the previous segment is also a bisuperellipse.

LISTING OF PROGRAMS

38.4

Program SCIRCL

50.SCIRCL		05 MAY 77	13
1.C	PREPARE INPUT DATA FOR DOUGLAS POTENTIAL FLOW PROGRAMS EON AND 22YA	CC00	
2.C		A	0010
3.C	SECOND VERSION - SPACING SPECIFIED	A	0020
4.C		A	0030
5.	DIMENSION REEDEN(2),ARE(9),EX(9),CURVO(9),SURFAC(9)	A	0040
6.	DIMENSION CAPPER(200),DIST(200),KAY(4),TYP(4),IREDON(4)	A	0050
7.	DIMENSION SD(500),S(500),NY(25)	A	0060
8.	COMMON /SPREP/ KPREP,NIN	A	0070
9.	COMMON /HNSO/ NNSO,N5DBDY(10)	A	0080
10.	COMMON /NHIGH/ NSPHG,NLAST,XLAST(500),YLAST(500)	A	0090
11.	COMMON /HWRT/ IFLAG,NDY4,PROG,TITLE(9),BODIES(4),IDENT,YLO(25),YHA	A	0100
12.	II(25),NDY(25),XRAK(25),NBP2TS(5),NO6,NRAKES	A	0110
13.	COMMON /FOR3SS/IC,DEL5,XBK(25),YBK(25),XON(500),YON(500),DYDXO(500)	A	0120
14.	1),ALPHA(500),CAPPA(500),SON(500),PIO180	A	0130
15.	COMMON /FORCON/ IGEOMF,ISIGF,ICURVN,NONEWF,IVORT	A	0140
16.	COMMON /SUPP/ IFLO	A	0150
17.	COMMON/SEGNO/NSEGO,J	A	0160
18.	COMMON /HAIN/ XIN(10),YIN(10),DELSMX,PIO2,DFLS1,IHUB	A	0170
19.	COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS	A	0180
20.C	THE GENERAL PLOTTING VARIABLES	A	0190
21.	COMMON/ LOT/XMIN,YMIN,ORD,EXEP,XX,YY,LPNCHO,IPLOTA,MM	A	0200
22.	COMMON/TITL/ TTITL(9,6)	A	0210
23.	COMMON/TOL/BAGS(15),BAGX(15),ZAP(15),NZAP(15)	A	0220
24.	COMMON/SENSE/ X(2),Y(2),A,B	A	0230
25.	COMMON/PAC/ PACE,DELSHL	A	0240
26.	DATA BLANK/6H /	A	0250
27.	DATA EODFF/6HENDOFF/	A	0260
28.	DATA REDONE/6HREDONE/	A	0270
29.	PI=3.14159265	A	0280
30.	PIO180=PI/180.	A	0290
31.	PIO2=PI/2.	A	0300
32.C		A	0310
33.C	WHEN NO6 = 1, A FLAG IN CARD COLUMN 6 IS PUNCHED FOR 500	A	0320
34.C	ONLY BASIC DATA WILL BE GIVEN IN 500 PROGRAM	A	0330
35.C		A	0340
36.	CALL PLOTID	A	0350
37.C	READ AXIS LABELS FOR THE MOST POPULAR PLOTTED VARIABLES	A	0360
38.	READ (5,500)ARE	A	0370
39.	READ (5,500)EX	A	0380
40.	READ (5,500)CURVO	A	0390
41.	READ (5,500)SURFAC	A	0400
42.	CALL ECHO	A	0410
43.	10 NIN=25	A	0420
44.	READ (25,500,END=630)TITLE	A	0430
45.	IF (FLO(0,36,TITLE(1)).EQ.FLO(0,36,EODFF)) GO TO 630	A	0440
46.	REWIND 4	A	0450
47.	LOWER=0	A	0460
48.C	READ GENERAL PLOTTING VARIABLES	A	0470
49.	READ (25,555)XX,XMIN,EXEP,YY,YMIN,ORD	A	0480
50.	15 FORMAT(4I1,10X,I1)	A	0490
51.	READ (25,15)IGEOMF,ISIGF,ICURVN,NONEWF,IVORT	A	0500
52.	20 READ (NIN,490)IDENT,PROG,NO6,LPNCHO,IPLOTA,IPLOTC,IREAD,IAR,(IREDOA	A	0510
53.	2N(I),I=1,5)	A	0520
54.	LPDUM=LPNCHO	A	0530
55.	IF (LPDUM.EQ.0)LPNCHO=1	A	0540
56.	IF (LPDUM.EQ.1)LPNCHO=C	A	0550

57.	75 JSTART=3	A	0560
58.	JSTOP=0	A	0570
59.	FACE=0.	A	0580
60.	IF (IAB.LE.0) GO TO 30	A	0590
61.	READ (NIN,625)XAA,VAA,XBB,YBB	A	0600
62.	IBUMB=0	A	0610
63.	WRITE (4,495)IDENT,PROG,NO6,(IREDON(I),I=2,4),IBUMB,(IREDON(I),I=2,4)	A	0620
64.	2,4)	A	0630
65.	CCCCCCCC LEEHI WILL CONTAIN THE VALUE OF N AT THE HIGHLIGHT. NEEDED TO SPA	A	0640
66.	CCCCCCCC THE CURVATURE VS. X PLOTS INTO INTERNAL AND EXTERNAL PORTIONS	A	0650
67.	CCCCCCCC MM COUNTS THE NO. OF SEGMENTS ON SHROUD AS PLOTTING PROCEEDS	A	0660
68.	30 MM=0	A	0670
69.	LEEHI=9000	A	0680
70.	CCCCCCCC LOAD AXIS LABELS INTO COMMON	A	0690
71.	IF (NIN.EQ.4) GO TO 40	A	0700
72.	DO 35 I=1,9	A	0710
73.	ITITLE(I,1)=ITITLE(I)	A	0720
74.	ITITLE(I,2)=BLANK	A	0730
75.	ITITLE(I,3)=ARE(I)	A	0740
76.	ITITLE(I,4)=EX(I)	A	0750
77.	ITITLE(I,5)=CURVO(I)	A	0760
78.	35 ITITLE(I,6)=SURFAC(I)	A	0770
79.	40 WRITE (6,525)IDENT,ITITLE	A	0780
80.	IF (NIN.EQ.4) WRITE (6,470)	A	0790
81.	IF (NIN.EQ.4) GO TO 55	A	0800
82.	WRITE (6,45)IGEHF,ISIGF,ICURVN,NONEWF,IVORT	A	0810
83.	45 FORMAT(IH,60HFLAG INPUT, 1ST RECORD - FORCED. 2ND - PUNCH,PLOT,REA	A	0820
84.	100 FLAGS/IH,4I1,10X,I1)	A	0830
85.	IF (IVORT.EQ.0) GO TO 50	A	0840
86.	IVORT=0	A	0850
87.	GO TO 55	A	0860
88.	50 IVORT=1	A	0870
89.	55 WRITE (6,60)IDENT,PROG,NO6,LPNCHO,IPLOTA,IPLOT,IREAD,IAB,(IREDON(I),I=1,5)	A	0880
90.	11,I=1,5)	A	0890
91.	60 FORMAT(IH,2A6,14,2I1,2I2,10X,I1,9X,3I1,2I2)	A	0900
92.	CCCCCCCC PLOT THE AXES NEEDED FOR THE INLET PICTURE, AND LABEL THE CASE	A	0910
93.	65 CALL PLOXIS(XX,YY,EXEP,ORD,XMIN,YMIN,.25,.25,0,0,1,2,1,1)	A	0920
94.	CALL SYMBOL(-.3,YY-.5,.25,IDENT,0.,6)	A	0930
95.	CALL SYMBOL(XX-1.50,.5,.25,IDENT,0.,6)	A	0940
96.	IF(NIN.EQ.4)CALL SYMBOL(XX/2.,YY-.5,.25,REDONE,0.,6)	A	0950
97.	IF (NIN.EQ.4) GO TO 75	A	0960
98.	C	A	0970
99.	C HEAD INPUT CARDS FOR SUPERCIRCLE	A	0980
100.	C 1 -- CASE HEADER CARD -- NO. OF BODIES,CASE NO.,DELS,DELSMX	A	0990
101.	C OFF-BODY	A	1000
102.	C 2 -- NRAKES = NUMBER OF RAKES (TOTAL NUMBER CANNOT EXCEED 25)	A	1010
103.	C 3 -- X,YLO,YHI, NY (DATA FOR EACH RAKE)	A	1020
104.	C X = X OF THE RAKE,	A	1030
105.	C YLO = Y OF THE FIRST PT. ON RAKE CLOSEST TO THE HUB - SHOULD BE	A	1040
106.	C ABOUT DS GREATER THAN Y ON HUB	A	1050
107.	C YHI = Y OF THE LAST PT ON RAKE CLOSEST TO THE SHROUD - SHOULD BE	A	1060
108.	C ABOUT DS LESS THAN Y ON SHROUD	A	1070
109.	C NY = NO. OF PTS TO GENERATE FOR THAT RAKE	A	1080
110.	C ON-BODY	A	1090
111.	C FOR EACH SEGMENT A DESCRIPTION CARD IS NEEDED,	A	1100
112.	C THIS CARD DENOTES THE TYPE OF LINE, AND THE	A	1110
113.	C COORDINATES OF THE LINE (UP TO 6 SETS)	A	1120

114.C		A	1130
115.	READ (INTN,555,END=630)ANBDYS,DELS,DELSMX,XRI,ANNSD	A	1140
116.	RFAD (INTN,485)NRAKES	A	1150
117.	READ (INTN,555)(XRAK(I),YLO(I),YHI(I),NY(I),I=1,NRAKES)	A	1160
118.	WRITE (6,480)ANBDYS,DELS,DELSMX,XRI	A	1170
119.	DO 70 I=1,NRAKES	A	1180
120.		A	1190
121.	70 NDY(I)=NY(I)-1	A	1200
122.	75 NLAST=0	A	1210
123.	NSPHG=0	A	1220
124.	DSAVE=DELS	A	1230
125.	DELS2=DELS	A	1240
126.	DLEST=DELS	A	1250
127.	NRDYS=ANBDYS	A	1260
128.	NNSD=ANNSD	A	1270
129.C		A	1280
130.C	K = COUNTER FOR THE NUMBER OF ONBODY POINTS GENERATED	A	1290
131.C	IHUB = 0, WHEN THERE IS ONLY ONE BODY-- IF THERE IS ONE BODY	A	1300
132.C	IT MUST BE THE SHROUD.	A	1310
133.C	IFLAG = 0, IF THERE IS MORE THAN ONE BODY	A	1320
134.C		A	1330
135.	K=0	A	1340
136.	IHUB=0	A	1350
137.	IFLAG=0	A	1360
138.C		A	1370
139.C	NZ LOOP IS FOR THE NUMBER OF BODIES	A	1380
140.C		A	1390
141.	DO 225 MZ=1,NRDYS	A	1400
142.	IFLD=0	A	1410
143.	IF (NZ.GE.2) IHUB=1	A	1420
144.C		A	1430
145.C	TYPBDY = 1 FOR HUB ---- TYPBDY = 2 FOR SHROUD	A	1440
146.C	OR	A	1450
147.C	TYPBDY=1 FOR HUB * TYPBDY=2 FOR FLOW SPLITTER * =3 FOR SHROUD	A	1460
148.C	*****FLOW SPLITTER PROGRAMMING IS NOT COMPLETE THROUGH COMBYN*****	A	1470
149.C	OR	A	1480
150.C	IF THE HUB IS TO BE MIRRORED , SET TYPBDY FOR THE SHROUD = 0.C	A	1490
151.C		A	1500
152.	READ (INTN,555)TYPBDY,ANSEG	A	1510
153.	IF (IAB.GT.0) WRITE (4,555)TYPBDY,ANSEG	A	1520
154.	ASEG=ANSEG	A	1530
155.	IF (NRDYS.EQ.2.AND.NZ.EQ.2.AND.TYPBDY.NE.0.C) TYPBDY=3.0	A	1540
156.	IF (NRDYS.EQ.1.AND.TYPBDY.EQ.2.0) IFLAG=1	A	1550
157.	IF (TYPBDY.EQ.1.) WRITE (6,590)	A	1560
158.	IF (TYPBDY.EQ.3.C.OR.TYPBDY.EQ.0.C.OR.NRDYS.EQ.1) WRITE (6,595)	A	1570
159.	IF (TYPBDY.EQ.0.C) GO TO 215	A	1580
160.	IF (TYPBDY.EQ.2.C.AND.NRDYS.GT.1) WRITE (6,600)	A	1590
161.	K=K+1	A	1600
162.	SON(KI)=0	A	1610
163.C		A	1620
164.	IF (NZ.EQ.NBD)NSEG=NSEG-LOWER	A	1630
165.C	SEGMENT LOOP	A	1640
166.C		A	1650
167.	DO 200 J=1,NSEG	A	1660
168.C	((((DIRECT INTERPOLATION FLAG--	A	1670
169.	80 IF (NSEG.FQ.0) GO TO 155	A	1680
170.	READ (INTN,555)ENRFD,(REEDEN(I),I=1,2)	A	1690

171.	IF (ENREED.EQ.0..OR.ENREED.GT.999.) WRITE (6,85)ENREED	A	1700
172.	85 FORMAT(1H,SHENREED=,F9.2)	A	1710
173.	IF (IAB.GT.0) WRITE (4,555)ENREED,(PEFDEN(I),I=1,2)	A	1720
174.	IF (ENREED.EQ.99.) GO TO 155	A	1730
175.	READ (NIN,625)(XIN(I),I=1,3),XIN(6),(XIN(I),I=4,5)	A	1740
176.	READ (NIN,625)(YIN(I),I=1,3),YIN(6),(YIN(I),I=4,5)	A	1750
177.	IF (IAB.GT.0) WRITE (4,625)(XIN(I),I=1,3),XIN(6),(XIN(I),I=4,5)	A	1760
178.	IF (IAB.GT.0) WRITE (4,625)(YIN(I),I=1,3),YIN(6),(YIN(I),I=4,5)	A	1770
179.	90 KSV=K	A	1780
180.	CAPPA(K)=0.0	A	1790
181.	IF (ENREED.NE.1.0.AND.ENREED.NE.10.) GO TO 105	A	1800
182.	XON(K)=XIN(1)	A	1810
183.	YON(K)=YIN(1)	A	1820
184.	WRITE (6,570)ENREED,(XIN(I),I=1,2),(YIN(I),I=1,2)	A	1830
185.	C(111) KK= FIRST POINT ON CURRENT SEGMENT TO BE PLOTTED	A	1840
186.	KK=K	A	1850
187.	IF (IYPROY.GE.2.0) GO TO 100	A	1860
188.	IF (ENREED.EQ.1.0.AND.J.EQ.NSEG) CALL FNSTRH (K)	A	1870
189.	IF (ENREED.EQ.1.0.AND.J.NE.NSEG) CALL STRAIT (K,J,0)	A	1880
190.		A	1890
191.		A	1900
192.	IF (ENREED.EQ.10.) CALL FRSTSH (K)	A	1910
193.	95 DYDXO(KSV)=DYDXO(KSV+1)	A	1920
194.	ALPHA(KSV)=ALPHA(KSV+1)	A	1930
195.	C(111) (KK= TOTAL NO. OF POINTS TO BE PLOTTED FOR THIS SEGMENT	A	1940
196.	KK=K-KK	A	1950
197.	C(111) PLOT CURRENT SEGMENT	A	1960
198.	CALL DRAW(KK,KK)	A	1970
199.	GO TO 160	A	2020
200.	100 IF (J.EQ.1) CALL FRSTSH (K)	A	2030
201.	IF (J.EQ.NSEG) CALL FNSTRH (K)	A	2040
202.	IF (J.NE.1.AND.J.NE.NSEG) CALL STRAIT (K,J,0)	A	2050
203.	GO TO 95	A	2060
204.	105 IF (ENREED.LT.-2.) GO TO 150	A	2070
205.	IF (ENREED.LT.-1.) GO TO 140	A	2080
206.		A	2090
207.	IF (ENREED.LT.0.0) GO TO 135	A	2100
208.	C	A	2110
209.		A	2120
210.	SET-UP SUPER ELLIPSE	A	2130
211.	C	A	2140
212.	KPREP=0	A	2150
213.	ENRD=ENREED-1000.	A	2160
214.	IF (ENRD.LT.0.0) GO TO 110	A	2170
215.	PACE=ENREED-1000.	A	2180
216.	IF (PACE.LE.0.)PACE=.05	A	2190
217.	ENREED=0.	A	2200
218.	IFLD=IFLD+1	A	2210
219.	GO TO 115	A	2220
220.	110 IFLD=0	A	2230
221.	115 WRITE (6,575)PEFDEN(1),YXIN(1),Y=1,3),XIN(6),(XIN(I),I=4,5),PEFDEN(	A	2240
222.	112),YIN(1),Y=1,3),YIN(6),(YIN(I),I=4,5)	A	2250
223.	CALL TEST (5)	A	2260
224.	1START=K	A	2270
225.	KI=K	A	2280
226.	KK=K	A	2290
227.	CALL SUPERC(XIN,YIN,REEDEN,DELSI,1START)	A	2300

228.	K=10-1	A	2310
229.	IF (NZ.EQ.1) GO TO 125	A	2320
230.	KKKK=K-1	A	2330
231.	DO 120 JC=1,START,KKKK	A	2340
232.	IF (XON(JC).EQ.XON(JC+1)) GO TO 120	A	2350
233.	IF ((IDYDX(JC)-IDYDX(JC+1))/(XON(JC)-XON(JC+1))*CAPPA(JC).LT.0.)CAPA	A	2360
234.	IPA(JC)=-CAPPA(JC)	A	2370
235.	120 CONTINUE	A	2380
236.	125 K2=K	A	2390
237.	IDUM=C	A	2400
238.	IF (KPREP.EQ.0) GO TO 130	A	2410
239.	CALL PRELPS (IDUM,1,5,K1,K2)	A	2420
240.	130 KR=K-KK	A	2430
241.	CALL DRAW(KR,KK)	A	2440
242.	IF (ABS(XON(KK)-XAA+YON(KK)-YAA).LE.1.E-7)JSTART=KK	A	2450
243.	IF (ABS(XON(K) -XBP+YON(K) -YBB).LE.1.E-7)JSTOP=K	A	2460
244.	IF (JSTART.EQ.KK)MPD=NZ	A	2470
245.	GO TO 160	A	2480
246.C		A	2490
247.C	SET-UP LEMNISCATE	A	2500
248.C		A	2510
249.	135 WRITE (6,580)ENREED,(XIN(1),I=1,3),(YIN(1),I=1,3)	A	2520
250.	KK=K	A	2530
251.	CALL LEM (K)	A	2540
252.	K=K+1	A	2550
253.	KR=K-KK	A	2560
254.	CALL DRAW(KR,KK)	A	2570
255.	IF (ABS(XON(KK)-XAA+YON(KK)-YAA).LE.1.E-7)JSTART=KK	A	2580
256.	IF (ABS(XON(K) -XBP+YON(K) -YBB).LE.1.E-7)JSTOP=K	A	2590
257.	IF (JSTART.EQ.KK)MPD=NZ	A	2600
258.	GO TO 160	A	2610
259.C		A	2620
260.C	SET-UP ELLIPSE	A	2630
261.C		A	2640
262.	140 WRITE (6,585)ENREED,(XIN(1),I=1,4),(YIN(1),I=1,4)	A	2650
263.	KPREP=0	A	2660
264.	CALL TEST (4)	A	2670
265.	K1=K	A	2680
266.	KK=K	A	2690
267.	CALL ELLPSC (K)	A	2700
268.	K=K+1	A	2710
269.	K2=K	A	2720
270.	IDUM=C	A	2730
271.	IF (KPREP.EQ.0) GO TO 145	A	2740
272.	CALL PRELPS (IDUM,1,4,K1,K2)	A	2750
273.	145 KR=K-KK	A	2760
274.	CALL DRAW(KR,KK)	A	2770
275.	IF (ABS(XON(KK)-XAA+YON(KK)-YAA).LE.1.E-7)JSTART=KK	A	2780
276.	IF (ABS(XON(K) -XBP+YON(K) -YBB).LE.1.E-7)JSTOP=K	A	2790
277.	IF (JSTART.EQ.KK)MPD=NZ	A	2800
278.	GO TO 160	A	2810
279.C		A	2820
280.C	SET-UP CUBIC	A	2830
281.C		A	2840
282.	150 WRITE (6,605)ENREED,(XIN(1),I=1,4),(YIN(1),I=1,4)	A	2850
283.	KK=K	A	2860
284.	CALL CUBIC (K)	A	2870

285.	K=K+1	A	2860
286.	KR=K-KK	A	2890
287.	CALL DRAW(KR,KK)	A	2900
288.	IF (ABS(XON(KK)-XAA+YON(KK)-YAA).LE.1.E-7) JSTART=KK	A	2910
289.	IF (ABS(XON(K) -XBR+YON(K) -YBB).LE.1.E-7) JSTOP=K	A	2920
290.	IF (JSTART.EQ.KK) MBD=NZ	A	2930
291.	GO TO 160	A	2940
292.C	(((NEW LINEAR INTEGRATION OPTION, BODY OR FULL INLET	A	2950
293.	155 KK=K	A	2960
294.	KSV=K	A	2970
295.	CAPPA(K)=0.0	A	2980
296.	IF (INSEG.EQ.0) DELS1=DELSM	A	2990
297.	CALL XVCALC(K,K2,MIN)	A	3000
298.	K=K2	A	3010
299.	KR=K-KK	A	3020
300.	CALL DRAW(KR,KK)	A	3030
301.	160 IF (IAB.LE.0) GO TO 200	A	3040
302.	IF ((JSTART+JSTOP).EQ.0.OR.(JSTOP.GT.0.AND.K.GT.JSTOP)) GO TO 200	A	3050
303.	DO 165 K9=1,3	A	3060
304.	165 BACKSPACE 4	A	3070
305.	IF (JSTART.NE.KK) GO TO 180	A	3080
306.	WRITE (4,170)	A	3090
307.	170 FORMAT(3X,3H99.,74X)	A	3100
308.	WRITE (4,445) XON(KK),YON(KK)	A	3110
309.	KK1=KK+1	A	3120
310.	DO 175 K9=KK1,K	A	3130
311.	175 WRITE (4,450) XON(K9),YON(K9)	A	3140
312.	BACKSPACE 4	A	3150
313.	IF (JSTOP.NE.K) GO TO 180	A	3160
314.	WRITE (4,455) XON(K),YON(K)	A	3170
315.	GO TO 200	A	3180
316.	180 IF (JSTOP.NE.K) GO TO 190	A	3190
317.	LOWER=LOWER+1	A	3200
318.	KM1=K-1	A	3210
319.	DO 185 K9=KK,KM1	A	3220
320.	185 WRITE (4,450) XON(K9),YON(K9)	A	3230
321.	WRITE (4,455) XON(K),YON(K)	A	3240
322.	GO TO 200	A	3250
323.	190 IF (JSTART.EQ.KK.AND.JSTOP.EQ.0) GO TO 200	A	3260
324.	LOWER=LOWER+1	A	3270
325.	KM1=K-1	A	3280
326.	DO 195 K9=KK,KM1	A	3290
327.	195 WRITE (4,450) XON(K9),YON(K9)	A	3300
328.	200 WRITE (6,205) K,XON(K),YON(K),CAPPA(K),DYDXO(K),ALPHA(K)	A	3310
329.	205 FORMAT(1H0,3X,11HLAST POINT ,2HK=,15,4H, X=,E12.5,4H, Y=,E12.5,7H,	A	3320
330.	1KAPPA=,E12.5,7H,DY/DX=,E12.5,7H,ALPHA=, E12.5)	A	3330
331.C		A	3340
332.C	END OF SEGMENT LOOP	A	3350
333.C		A	3360
334.	210 GO TO 220	A	3370
335.	215 KK=K+1		
336.	CALL MIRROR (K,ANSEG)	A	3380
337.	KR=K-KK		
338.	CALL DRAW(KR,KK)		
339.	220 NBDPTS(INZ)=K	A	3390
340.	NBDY1=NBDPTS(1)	A	3400
341.	NBDY2=NBDPTS(2)	A	3410

342.	TYP(INZ)=TYPBDY	A	3420
343.	KAY(INZ)=K	A	3430
344.	225 CONTINUE	A	3440
345.C		A	3450
346.C	END OF BODY LOOP	A	3460
347.C		A	3470
348.	ITOP12=K	A	3480
349.	IF (IFLAG.EQ.1) NBDY2=ITOP12	A	3490
350.	DELSND =DELS	A	3500
351.	IF (IFLAG.EQ.1) NBDY1=0	A	3510
352.C9		A	3520
353.C		A	3530
354.C	CO-ORDINATES OF POINTS ON DOWNSTREAM CLOSURE	A	3540
355.C		A	3550
356.C		A	3560
357.C	STRAIGHT SECTION BETWEEN HUB AND SHROUD OR SPLITTER	A	3570
358.C		A	3580
359.C		A	3590
360.	IF (NBDY1.EQ.0) GO TO 230	A	3600
361.	YNBDY1=YON(NBDY1)	A	3610
362.	Y4SAVE=YON(NBDY1)	A	3620
363.	Y5SAVE=YON(NBDY1+1)	A	3630
364.	Y6SAVE=YON(NBDY2)	A	3640
365.	Y7SAVE=YON(NBDY2+1)	A	3650
366.	GO TO 235	A	3660
367.	230 YNBDY1=0.0	A	3670
368.	Y4SAVE=0.0	A	3680
369.	235 NDY4=(YON(NBDY1+1)-YNBDY1)*1.5/DELSMX	A	3690
370.	ENDY4=NDY4	A	3700
371.	NPTS=NDY4+1	A	3710
372.	NBDPTS(NBDYS+1)=NPTS+NBDPTS(NBDYS)	A	3720
373.	DY4=(YON(NBDY1+1)-YNBDY1)/ENDY4	A	3730
374.	DO 240 I=1,NPTS	A	3740
375.	AYEM=I-1	A	3750
376.	IPN=I+K	A	3760
377.	XON(IPN)=XON(NBDY1+1)	A	3770
378.	YON(IPN)=YNBDY1+AYEM*DY4	A	3780
379.	240 CONTINUE	A	3790
380.	245 ITOPT4=K+1	A	3800
381.	ITOPT5=ITOPT4+NDY4	A	3810
382.	IF (NBDYS.LE.2) GO TO 255	A	3820
383.C		A	3830
384.C		A	3840
385.C	STRAIGHT SECTION BETWEEN FLOW SPLITTER AND SHROUD	A	3850
386.C		A	3860
387.C		A	3870
388.	YNBDY2=Y6SAVE	A	3880
389.	NDY5=(Y7SAVE-Y6SAVE)*1.5/DELSMX	A	3890
390.	ENDY5=NDY5	A	3900
391.	NPTS=NDY5+1	A	3910
392.	NBDPTS(NBDYS+2)=NPTS+NBDPTS(NBDYS+1)	A	3920
393.	DY5=(Y7SAVE-Y6SAVE)/ENDY5	A	3930
394.	DO 250 I=1,NPTS	A	3940
395.	AYEM=I-1	A	3950
396.	IPN=I+ITOPT5	A	3960
397.	XON(IPN)=XON(NBDY2+1)	A	3970
398.	YON(IPN)=YNBDY2+AYEM*DY5	A	3980

399.	250	CONTINUE	A	3990
400.		ITOPT6=ITOPT5+1	A	4000
401.		ITOPT7=ITOPT6+NBYS	A	4010
402.C			A	4020
403.C		CALL SUBROUTINE TO WRITE AND PUNCH CARDS	A	4030
404.C			A	4040
405.	255	CALL WPUNCH	A	4050
406.		IF (NBYS.GT.2) GO TO 260	A	4060
407.		NT1=ITOPT5-3	A	4070
408.		NT2=K-2	A	4080
409.		GO TO 265	A	4090
410.	260	NT1=ITOPT7-5	A	4100
411.		NT2=ITOPT5-4	A	4110
412.		NT3=K-3	A	4120
413.		NSPLMX=NBODY2-2	A	4130
414.	265	NHUBMX=NBODY1-1	A	4140
415.		NP=0	A	4150
416.		DO 270 I=1,NRAKES	A	4160
417.		NP=NP+NDY(I)+1	A	4170
418.	270	CONTINUE	A	4180
419.		NHBMXD=NHUBMX	A	4190
420.		IF (NBYS.LE.2) GO TO 275	A	4200
421.		WRITE (6,565)NT1,NT2,NT3,NHUBMX,NSPLMX,NP	A	4210
422.		GO TO 285	A	4220
423.	275	IF (NHUBMX.GT.0) GO TO 280	A	4230
424.		NHUBMX=NHUBMX+1	A	4240
425.		NT1=NT1+1	A	4250
426.		NT2=NT2+1	A	4260
427.	280	WRITE (6,540)NT1,NT2,NHUBMX,NP	A	4270
428.C			A	4280
429.C		CALCULATING HUB SURFACE DISTANCE (S-S(2))	A	4290
430.C			A	4300
431.	285	CALL SINTP (XON,SON,NBYS,XR1,S2)	A	4310
432.		WRITE (6,505)	A	4320
433.		IF (IFLAG.EQ.1) GO TO 295	A	4330
434.		SDEL=0.0	A	4340
435.		DO 290 I=1,NBYS	A	4350
436.		IF (I.NE.1) SDEL=SON(I)-SON(I-1)	A	4360
437.		S(I)=SON(I)-S2	A	4370
438.	290	WRITE (6,520)I,XON(I),YON(I),CAPPA(I),DYDXO(I),ALPHA(I),SON(I),SOI	A	4380
439.		I),SDEL	A	4390
440.C			A	4400
441.C		CALCULATION SHROUD OR LOWER FLOW SPLITTER SURFACE DISTANCE	A	4410
442.C			A	4420
443.	295	NBP1=NBYS+1	A	4430
444.		IF (NBYS.EQ.1) NBODY2=ITOP12	A	4440
445.		DO 300 J=NBP1,NBODY2	A	4450
446.		JJ=J	A	4460
447.		IF (XON(I).LT.XON(I+1)) GO TO 305	A	4470
448.	300	CONTINUE	A	4480
449.	305	CALL SINTP (XON(NBP1),SON(NBP1),JJ-NBYS,XR1,S22)	A	4490
450.		IF (IFLAG.EQ.1) GO TO 310	A	4500
451.		WRITE (6,510)	A	4510
452.	310	IF (NBYS.LE.2) JJ=NBODY2	A	4520
453.		SDEL=0.0	A	4530
454.		DO 315 I=NBP1,JJ	A	4540
455.		IF (I.NE.NBP1) SDEL=SON(I)-SON(I-1)	A	4550

456.	S(I)=S22-SON(I)	A	4560
457.	315 WRITE (6,520)I,XON(I),YON(I),CAPPA(I),DYDXO(I),ALPHA(I),SON(I),S(I)	A	4570
458.	1),SDEL	A	4580
459.	IF (NBDYS.LE.2) GO TO 340	A	4590
460.C		A	4600
461.C	CALCULATING FLOW SPLITTER UPPER SURFACE DISTANCE	A	4610
462.C		A	4620
463.	JJ=JJ+1	A	4630
464.	WRITE (6,530)	A	4640
465.	CALL SINTP (XON(JJ),SON(JJ),NBDY2-JJ,XR1,S23)	A	4650
466.	SDEL=0.0	A	4660
467.	DO 320 I=JJ,NBDY2	A	4670
468.	IF (I.NE.JJ) SDEL=SON(I)-SON(I-1)	A	4680
469.	S(I)=SON(I)-S23	A	4690
470.	320 WRITE (6,520)I,XON(I),YON(I),CAPPA(I),DYDXO(I),ALPHA(I),SON(I),S(I)	A	4700
471.	1),SDEL	A	4710
472.C		A	4720
473.C	CALCULATING SHROUD SURFACE DISTANCE (IF THERE IS A FLOW SPLITTER)	A	4730
474.C		A	4740
475.	NBP1=NBDY2+1	A	4750
476.	DO 325 I=NBP1,ITOP12	A	4760
477.	JJ=I	A	4770
478.	IF (XON(I).LT.XON(I+1)) GO TO 330	A	4780
479.	325 CONTINUE	A	4790
480.	330 CALL SINTP (XON(NBP1),SON(NBP1),JJ-NBDY2,XR1,S73)	A	4800
481.	WRITE (6,535)	A	4810
482.	SDEL=0.0	A	4820
483.	DO 335 I=NBP1,ITOP12	A	4830
484.	IF (I.NE.NBP1) SDEL=SON(I)-SON(I-1)	A	4840
485.	S(I)=S33-SON(I)	A	4850
486.	335 WRITE (6,520)I,XON(I),YON(I),CAPPA(I),DYDXO(I),ALPHA(I),SON(I),S(I)	A	4860
487.	1),SDEL	A	4870
488.C		A	4880
489.	340 NBDYS=NBDYS	A	4890
490.	IF (NNSD.EQ.0) GO TO 350	A	4900
491.	NS=1	A	4910
492.	345 IBD=NBDYS+NS	A	4920
493.	INSD=1+NSDBDY(NS)	A	4930
494.	I=INSD	A	4940
495.	WRITE (6,610)IBD	A	4950
496.	WRITE (6,615)I,XON(I),YON(I),CAPPA(I),DYDXO(I),ALPHA(I),SON(I),I=	A	4960
497.	1)IBNSD,INSD)	A	4970
498.	NS=NS+1	A	4980
499.	IF (NS.LE.NNSD) GO TO 345	A	4990
500.	NBDYS=IBD	A	5000
501.C		A	5010
502.C	WRITE OUT CLOSURE COORDINATES	A	5020
503.C		A	5030
504.	350 IBD=NPDYS+1	A	5040
505.	WRITE (6,515)IBD,(I,XON(I),YON(I),I=ITOPT4,ITOPT5)	A	5050
506.	IF (NPDYS.NE.3) GO TO 355	A	5060
507.	IBD=IBD+1	A	5070
508.	WRITE (6,515)IBD,(I,XON(I),YON(I),I=ITOPT6,ITOPT7)	A	5080
509.	355 WRITE (6,545)(XRAK(I),YLO(I),YHI(I),NY(I),I=1,NRAKES)	A	5090
510.	CALL AREA	A	5100
511.C		A	5110
512.C		A	5120

513.C		A	5130
514.C111111	CURVATURE PLOTS	A	5140
515.C		A	5150
516.	LFL=6	A	5160
517.C111111	IF IPLOTG IS NOT ZERO, PLOT THE CURVATURE VS. S (IF IPLOTG .GT.0A	A	5170
518.C111111	OR VS.X (IF IPLOTG .LT.0A	A	5180
519.	IF (IPLOTG.EQ.0) GO TO 405	A	5190
520.	IF (IPLOTG.LT.0) LFL=4	A	5200
521.	LE=0	A	5210
522.C111111	LEA = LAST PT. ON SHROUD	A	5220
523.	LEA=ITOPT4-1	A	5230
524.	LL=1	A	5240
525.C111111	TEST EACH SHROUD PT. FOR	A	5250
526.C111111	1) IN RANGE OF X-AXIS	A	5260
527.C111111	2) BEFORE OR AFTER HIGHLIGHT	A	5270
528.	3) FINITE CURVATURE	A	5280
529.	360 LEE=LL+NBDPTS(1)	A	5290
530.	IF (XON(LEE).GT.(XX*EXEP+XMIN)) GO TO 375	A	5300
531.	IF (XON(LEE).LT.XON(LEE+1).AND.LEE.LT.LEEH) GO TO 365	A	5310
532.	IF (CAPPA(LEE).EQ.99999.) GO TO 375	A	5320
533.	LE=LE+1	A	5330
534.	DIST(LE)=SON(LEE)	A	5340
535.C111111	CAPPER(LE)=CAPPA(LEE)	A	5350
536.	FLAG THE HIGHLIGHT	A	5360
537.	IF (XON(LEE).GT.XON(LEE+1)) GO TO 370	A	5370
538.C111111	IF (LEE.LT.LEEH) LEEH=LEE	A	5380
539.	USE ABSOLUTE VALUE OF CURVATURE ON EXTERIOR OF SHROUD	A	5390
540.	IF (CAPPER(LE).LT.0.) CAPPER(LE)=-CAPPER(LE)	A	5400
541.C111111	IF (IPLOTG.LT.0) DIST(LE)=XON(LEE)	A	5410
542.C111111	IF CURVAT.-VS.-X PLOT IS NEEDED AND HIGHLIGHT HAS BEEN REACHED,	A	5420
543.	PLOT THE FIRST FRAME (INTERNAL SHROUD PTS.)	A	5430
544.	IF (IPLOTG.LT.0.AND.LEE.EQ.LEEH) GO TO 380	A	5440
545.	375 LL=LL+1	A	5450
546.	IF (LL.LE.(ITOPT4-1-NBDPTS(1))) GO TO 360	A	5460
547.C111111	CALL PLOT(XX,0.,-3)	A	5470
548.C111111	IF THE SECOND X-CURVE (EXTERNAL PTS.) IS BEING PLOTTED, DO NOT	A	5480
549.	GENERATE NEW SCALE FACTORS. USE THOSE OF THE INTERNAL PLOT.	A	5490
550.	IF (LEE.GT.LEEH.AND.IPLOTG.LT.0) GO TO 385	A	5500
551.	CALL CSCALE(CAPPER,YY,LE,1,10,EXMIN,DEEX)	A	5510
552.	CAPPER(LE+1)=FXMIN	A	5520
553.	CAPPER(LE+2)=DEEX	A	5530
554.	IF (LEE.GT.LEEH.AND.IPLOTG.LT.0) GO TO 390	A	5540
555.	CALL CSCALE(DIST,YY,LE,1,10,EXMIN,DEEXD)	A	5550
556.	DIST(LE+1)=EXMIN	A	5560
557.	DIST(LE+2)=DEEXD	A	5570
558.	IF (IPLOTG.LT.0) DIST(LE+1)=XMIN	A	5580
559.C111111	IF (IPLOTG.LT.0) DIST(LE+2)=EXEP	A	5590
560.	DRAW AXES FOR CURVATURE PLOT	A	5600
561.	CALL PLOT(XX,YY,DIST(LE+2),CAPPER(LE+2),DIST(LE+1),CAPPER(LE+1),	A	5610
562.	1.25,.25,0,0,LE,5,1,2)	A	5620
563.	CALL LINE(DIST,CAPPER,LE,1,1,3,DIST(LE+1),DIST(LE+2),CAPPER(LE+1),	A	5630
564.C111111	ICAPPER(LE+2))	A	5640
565.	DRAW SEGMENT MARKERS	A	5650
566.	DO 400 MEM=1,MM	A	5660
567.	IF (IPLOTG.LT.0) BAGS(MEM)=BAGX(MEM)	A	5670
568.	IF (ZAP(MEM).LT.0.AND.NZAP(MEM).GT.LEEH) ZAP(MEM)=-ZAP(MEM)	A	5680
569.	IF (ZAP(MEM).EQ.99999.) ZAP(MEM)=YY*CAPPER(LE+2) + CAPPER(LE+1)	A	5690
	IF (LEE.GT.LEEH.AND.IPLOTG.LT.0) GO TO 395	A	

570.	BAGS(MEM)=(BAGS(MEM)-DIST(LE,1))/DIST(LE,2)	A	5700
571.	ZAP(MEM)=(ZAP(MEM)-CAPPER(LE,1))/CAPPER(LE,2)	A	5710
572.	IF (IPLOTG.GT.0.AND. NZAP(MEM).LT.LEEH1) CALL SYMBOL(BAGS(MEM),ZAP(A	A	5720
573.	MEM),,2,1,0,-1)	A	5730
574.	395 IF (IPLOTG.LT.0.AND.BAGS(MEM).GT.(XX*EXEP+XMIN)) GO TO 400	A	5740
575.	IF ((NZAP(MEM).LE.LEEH1.AND.LEE.EQ.LEEH1).OR.(NZAP(MEM).GE.LFEH1.ANA	A	5750
576.	1D.LEE.NF.LEEH1)) CALL SYMBOL(BAGS(MEM),ZAP(MEM),,2,1,0,-1)	A	5760
577.	400 CONTINUE	A	5770
578.	IF (LL.GT.(ITOPT4-1)-NBDPTS(1)).OR.LEE.GT.LEEH1.OR.XON(LEE).EQ.XON(A	A	5780
579.	1LFA)) GO TO 405	A	5790
580.	LE=0	A	5800
581.	CALL SYMBOL(XX-.5,YY-.5,.3,52,0,-1)	A	5810
582.	GO TO 375	A	5820
583.C		A	5830
584.C	*****	A	5840
585.C		A	5850
586.C	ADVANCE THE PLOT ORIGIN FOR THE NEXT CASE	A	5860
587.	405 CALL PLOT(XX,0,-3)	A	5870
588.C	IF THE CASE IS NOT TO BE REWORKED VIA FESSLER, BEGIN NEXT JOB	A	5880
589.	IF (IAB.LE.0) GO TO 410	A	5890
590.	REWIND 4	A	5900
591.	NIN=4	A	5910
592.	DELS =DSAVE	A	5920
593.	GO TO 20	A	5930
594.	410 IF (IREDON(1).EQ.0) GO TO 10	A	5940
595.	REWIND 4	A	5950
596.	LPNCHO= IREDON(2)	A	5960
597.	IPLOTA= IREDON(3)	A	5970
598.	IPLOTG= IREDON(4)	A	5980
599.	IREAD = IREDON(5)	A	5990
600.	IREDON(1)= IREDON(1)- 1	A	6000
601.C	WRITE THE ORIGINAL CASE OUTPUT ON UNIT 4 FOR ACCEPTANCE AS INPUTA	A	6010
602.C	BY DIRECT INTERPOLATION OPTION(XYCALC,FESSLER)	A	6020
603.	WRITE (4,475)IDENT,PROG,N06,LPNCHO,IPLOTA,IPLOTG,IAB,(IREDON(1),I=A	A	6030
604.	21,4)	A	6040
605.	DO 425 I=1,NBDYS	A	6050
606.	IF(NBDYS.EQ.2.AND.I.EQ.2) TYP(I)=2.	A	6060
607.	IF (I.EQ.1) GO TO 415	A	6070
608.	KA= KAY(I-1)+2	A	6080
609.	GO TO 420	A	6090
610.	415 KA=2	A	6100
611.	420 WRITE (4,440)TYP(I)	A	6110
612.	K0= KAY(I)-1	A	6120
613.	KAB=KA-1	A	6130
614.	WRITE (4,445)XON(KAB),YON(KAB)	A	6140
615.	WRITE (4,450)(XON(J),YON(J),J=KA,KB)	A	6150
616.	KC=KAY(I)	A	6160
617.	WRITE (4,455)XON(KC),YON(KC)	A	6170
618.	425 CONTINUE	A	6180
619.	IF (NNSD.EQ.0) GO TO 435	A	6190
620.	WRITE (4,460)DELSND	A	6200
621.	NTOT=0	A	6210
622.	DO 430 N=1,NNSD	A	6220
623.	NKA1=KAY(NBDYS)+ NTOT +1	A	6230
624.	NTOT= NTOT+ NSDBDY(N)	A	6240
625.	WRITE (4,465)XON(NKA1),YON(NKA1)	A	6250
626.	NA =NKA1+1	A	6260

627.	NO = NKA1 * NSBODY(N) -2	A	6270
628.	WRITE (4,450) (XON(J), YON(J), J=NA, NB)	A	6280
629.	NC = NB * 1	A	6290
630.	WRITE (4,455) XON(NC), YON(NC)	A	6300
631.	430 CONTINUE	A	6310
632.	435 MIN=4	A	6320
633.	REWIND 4	A	6330
634.	GO TO 20	A	6340
635.	440 FORMAT(F10.2,10H 0.)	A	6350
636.	445 FORMAT(1X,11H\$BODYIN Z=(,F10.6,1H,,F10.6,4H),)	A	6360
637.	450 FORMAT(12X,1H(,F10.6,1H,,F10.6,3H),)	A	6370
638.	455 FORMAT(12X,1H(,F10.6,1H,,F10.6,3H) \$/1X,20H\$AUXIN DONE=.TRUE. \$)	A	6380
639.	460 FORMAT(8F10.2)	A	6390
640.	465 FORMAT(3X,7H-1 /1X,11H\$BODYIN Z=(,F10.6,1H,,F10.6,4H),)	A	6400
641.	470 FORMAT(1H*,13X,6HREDONE)	A	6410
642.	475 FORMAT(2A6,I4,2I1, 12,12X,I1,9X,3I1, 12)	A	6420
643.C		A	6430
644.C	FORMATS	A	6440
645.C		A	6450
646.C		A	6460
647.	480 FORMAT (1H0,10X,16HNO. OF BODIES = ,F2.0,5X,7HDELS = ,F6.3,5X,9HDE	A	6470
648.	1LSMX = ,F6.3,5X,6HXR1 = ,F10.6)	A	6480
649.	485 FORMAT (20I4)	A	6490
650.	490 FORMAT(2A6,I4,2I1,2I2,10X,I1,9X,3I1,2I2)	A	6500
651.	495 FORMAT(2A6,I4,2I1, 12,12X,1H0,9X,3I1, 12)	A	6510
652.	500 FORMAT (9A6)	A	6520
653.	505 FORMAT (1X/1X23HBODY 1 CO-ORDINATES - X12X1HY10X5HKAPPA10X5HNDY/DX1A	A	6530
654.	10X5HALPHA5X1HS8X6HS-S(2),8X,6HDELTAS/1X)	A	6540
655.	510 FORMAT (1X/1X23HBODY 2 CO-ORDINATES - X12X1HY10X5HKAPPA10X5HNDY/DX1A	A	6550
656.	10X5HALPHA5X1HS,8X,7HS*(2)-S,8X,6HDELTAS/1X)	A	6560
657.	515 FORMAT (1X/1X5HBODY 11,17H CO-ORDINATES - X12X1HY/1X/(9X14,3XE12.5A	A	6570
658.	1,E13.5))	A	6580
659.	520 FORMAT (9X14,3XE12.5,7E13.5)	A	6590
660.	525 FORMAT (6HICASE A6,10X,9A6/1X)	A	6600
661.	530 FORMAT (1H0)	A	6610
662.	535 FORMAT (1X/1X,23HBODY 3 CO-ORDINATES - X,12X,1HY,10X,5HKAPPA,10X,5A	A	6620
663.	1HNDY/DX,10X,5HALPHA,5X,1HS,8X,6HS-S(3),8X,6HDELTAS/1X)	A	6630
664.	540 FORMAT (/10X,30H INPUT FOR THE COMBINE PROGRAM,7H NT(1)=,14,7H NT(2A	A	6640
665.	12)=,14,8H NHOBHX=,14,4H NP=,14/)	A	6650
666.	545 FORMAT (1X,4HXRAK,10X,3HYLO,11X,3HYHI,16X,3HNDY//,(3E14.5,5X,13))	A	6660
667.	550 FORMAT (3F8.5,13)	A	6670
668.	555 FORMAT (8F10.2)	A	6680
669.	560 FORMAT(F10.2,10F7.4/77.5,F7.2)	A	6690
670.	565 FORMAT (/5X,30H INPUT FOR THE COMBINE PROGRAM,7H NT(1)=,14,7H NT(2A	A	6700
671.	1)=,14,7H NT(3)=,14,8H NHOBHX=,14,8H NSPLMX=,14,4H NP=,14/)	A	6710
672.	570 FORMAT (1H0,10X,6HENREED,10X,13HSTRAIGHT LINE/11X,F6.3,5X,1HX,1P2EA	A	6720
673.	115.4/22X,1HY,1P2E15.4)	A	6730
674.	575 FORMAT(1H0,7X,9HEXPONENTS,10X,12HSUPERELLIPSE/7X,4HP = ,F6.3,5X,1HA	A	6740
675.	1X,1P6E15.4/7X,4HQ = ,DPF6.3,5X,1HY,1P6E15.4)	A	6750
676.	580 FORMAT (1H0,10X,6HENREED,10X,10HLEMNISCATE/11X,F6.3,5X,1HX,1P3E15.A	A	6760
677.	14/22X,1HY,1P3E15.4)	A	6770
678.	585 FORMAT (1H0,10X,6HENREED,10X,7HELLIPSE/11X,F6.3,5X,1HX,1P4E15.4/22A	A	6780
679.	1X,1HY,1P4E15.4)	A	6790
680.	590 FORMAT (1H0,2X,18H**** HUB *****)	A	6800
681.	595 FORMAT (1H0,2X,18H**** SHROUD *****)	A	6810
682.	600 FORMAT (1H0,2X,18H**** SPLITTER *****)	A	6820
683.	605 FORMAT (1H0,10X,6HENREED,10X,5HCUBIC/11X,F6.3,5X,1HX,1P4E15.4/22X,A	A	6830

684.	11HY,1P4E15.4)	A	6840
685.	610 FORMAT (1X/1X,5HBODY,12,17H CO-ORDINATES - X,12X,11HY,10X,5HKAPPA,1A	A	6850
686.	10X,5HCV/DX,10X,5HALPHA,5X,1HS,8X,6HS-S(2),8X,6HDELTAS/1X)	A	6860
687.	615 FORMAT (9X,14,3X,F12.5,5E13.5)	A	6870
688.	620 FORMAT(2F10.7)	A	6880
689.	625 FORMAT(6F12.5)	A	6890
690.	630 CALL PLOT(3.,0.,-3)	A	6900
691.	CALL PLOTID	A	6910
692.	STOP	A	6920
693.	END	A	6930

50. AREA		07 OCT 76	14
1.	SUBROUTINE AREA	21	0000
2.	COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS	21	0010
3.	COMMON /FORSS/IO,DEL5,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	21	0020
4.	1),ALPHA(500),CAPPA(500),SON(500),PIO180	21	0030
5.	COMMON /MNSD/ NNSD,NSDBDY(10)	21	0040
6.	COMMON/ LOT/XMIN,YMIN,ORD,EXEP,XX,YY,LPNCHO,IPLOTA,MH	21	0050
7.	DIMENSION JMAX(20), JMIN(20), AREA(20), YAR(20)	21	0060
8.	1,XXA(200), DISC(200),ANULUS(200)	21	0070
9.	PI=3.14159265	21	0080
10.	JPLA=0	21	0090
11.	NBP1=NBDY1+1	21	0100
12.	DO 10 J=NBP1,NBDY2	21	0110
13.	JJ=J	21	0120
14.	CITIT(1) .LT. CHANGED TO LE. TO AVOID AREA PLOTS FROM GOING UP VSTOL LIP	21	0130
15.	IF (XON(J).LE.XON(J+1)) GO TO 15	21	0140
16.	10 CONTINUE	21	0150
17.	15 WRITE (6,75)	21	0160
18.	IF (NNSD.EQ.0) GO TO 40	21	0170
19.	C	21	0180
20.	SEARCH FOR MINIMUM AND MAXIMUM X ON EACH NSD (SPLITTER)	21	0190
21.	C	21	0200
22.	NB=NBDY2+1	21	0210
23.	NE=NBDY2+NSDBDY(1)	21	0220
24.	DO 35 I=1,NNSD	21	0230
25.	XMIN=XON(NB)	21	0240
26.	JMIN(I)=NB	21	0250
27.	XMAX=XON(NB)	21	0260
28.	JMAX(I)=NB	21	0270
29.	NE=NE-1	21	0280
30.	DO 30 J=NB,NE	21	0290
31.	IF (XON(J).GT.XMAX) GO TO 20	21	0300
32.	IF (XON(J).LT.XMIN) GO TO 25	21	0310
33.	GO TO 30	21	0320
34.	20 XMAX=XON(J)	21	0330
35.	JMAX(I)=J	21	0340
36.	GO TO 30	21	0350
37.	25 XMIN=XON(J)	21	0360
38.	JMIN(I)=J	21	0370
39.	30 CONTINUE	21	0380
40.	NB=NE+1	21	0390
41.	NE=NE+NSDBDY(I+1)	21	0400
42.	WRITE (6,80)XMIN,XMAX,JMIN(I),JMAX(I)	21	0410
43.	35 CONTINUE	21	0420
44.	40 DO 65 J=NBP1,JJ	21	0430
45.	IA=1	21	0440
46.	CALL SINTP (XON,YON,NBDY1,XON(J),YAR(IA))	21	0450
47.	IF (NNSD.EQ.0) GO TO 50	21	0460
48.	JEND=NBDY2	21	0470
49.	DO 45 I=1,NNSD	21	0480
50.	JMI=JMIN(I)	21	0490
51.	JMA=JMAX(I)	21	0500
52.	JEND=NSDBDY(I)+JEND	21	0510
53.	IF (XON(J).GT.XON(JMA).OR.XON(J).LT.XON(JMI)) GO TO 45	21	0520
54.	IA=IA+1	21	0530
55.	CALL SINTP (XON(JMA),YON(JMA),JMI-JMA+1,XON(J),YAR(IA))	21	0540
56.	IA=IA+1	21	0550

57.	CALL SINYP (XON(JM),YON(JM),JEND-JM+1,XON(J),YAR(IA))	Z1	0560
58.	45 CONTINUE	Z1	0570
59.	50 IA=IA+1	Z1	0580
60.	YAR(IA)=YON(J)	Z1	0590
61.	IS=0	Z1	0600
62.	AREA=C.0	Z1	0610
63.	DO 55 I=1,IA,2	Z1	0620
64.	IS=IS+1	Z1	0630
65.	AREAS(IS)=(YAR(I+1)**2-YAR(I)**2)*PI	Z1	0640
66.	AREA=AREA+AREAS(IS)	Z1	0650
67.	55 CONTINUE	Z1	0660
68.	AREAD=AREA+YAR(1)**2*PI	Z1	0670
69.	ENSUBK=CAPPA(J)*(YON(J)-YAR(1))/SQRT(1.+YAR(1)/YON(J))	Z1	0680
70.	IF (CAPPA(J).GT.90000.)ENSUBK=99999.	Z1	0690
71.	IF (INSD.CO.0) GO TO 60	Z1	0700
72.	WRITE (6,85)(AREAS(I),I=1,IS)	Z1	0710
73.	60 WRITE (6,90)J,XON(J),YON(J),YAR(1),AREA,AREAD,ENSUBK	Z1	0720
74.	WRITE (6,95)	Z1	0730
75.	IF (XON(J).GT.(XX*EXEP+XMIN)) GO TO 65	Z1	0740
76.	JPLA=JPLA+1	Z1	0750
77.	XXA(JPLA)=XON(J)	Z1	0760
78.	ANULUS(JPLA)=AREA	Z1	0770
79.	DISC(JPLA)=AREAD	Z1	0780
80.	65 CONTINUE	Z1	0790
81.	C(1111) IF AREA PLOT IS NOT REQUIRED, GO TO 25	Z1	0800
82.	IF (IPLOTA.LE.0) GO TO 70	Z1	0810
83.	CALL CSCALE(DISC,YY,JPLA,1,10,EXMIN,DEEX)	Z1	0820
84.	CALL CSCALE(ANULUS,YY,JPLA,1,10,EXMIN,DEEX)	Z1	0830
85.	DISC(JPLA+1)=EXMIN	Z1	0840
86.	DISC(JPLA+2)=DEEX	Z1	0850
87.	CALL PLOT(XX,D.,-3)	Z1	0860
88.	CALL PLOXIS(XX,YY,EXEP,DISC(JPLA+2),XMIN,DISC(JPLA+1),.25,.25,0,0,	Z1	0870
89.	14,3,0,0)	Z1	0880
90.	C(1111) PLOT THE DISC AREA VS. X	Z1	0890
91.	CALL LINE(XXA,DISC,JPLA,1,1,3,XMIN,EXEP,DISC(JPLA+1),DISC(JPLA+2))	Z1	0900
92.	C(1111) PLOT THE ANNULUS AREA VS. X	Z1	0910
93.	CALL LINE(XXA,ANULUS,JPLA,1,1,3,XMIN,EXEP,DISC(JPLA+1),DISC(JPLA+2))	Z1	0920
94.	11)	Z1	0930
95.	70 RETURN	Z1	0940
96.	C	Z1	0950
97.	75 FORMAT (1H1//9X,1HI,14X,3HXON,18X,3HYON,16X,4HYONH,12X,4HAREA,14X,	Z1	0960
98.	19HDISC AREA,10X,6HENSUBK)	Z1	0970
99.	80 FORMAT (1HD,5X,7HXMIN = ,1PE14.5,5X,7HXMAX = ,1PE14.5,5X,7HJMIN =	Z1	0980
100.	1,I6,5X,7HJMAX = ,16)	Z1	0990
101.	85 FORMAT (74X,1PE19.4)	Z1	1000
102.	90 FORMAT (8X,13,1P6E19.4)	Z1	1010
103.	95 FORMAT (1HD)	Z1	1020
104.	END	Z1	1030

SO:KUBIC		07 OCT 76		13
1.	SUBROUTINE CUBIC (K)	J	0000	
2.C		J	0010	
3.C	FIT A CUBIC BETWEEN 2 STRAIGHT LINES -- RESTRICTION -- THE STRAIGHT	J	0020	
4.C	LINES CANNOT BE VERTICAL	J	0030	
5.C		J	0040	
6.	DIMENSION AA(4,4), BB(4)	J	0050	
7.	COMMON /MAIN/ XIN(10), YIN(10), DELSMX, P102, DELS1, INUR	J	0060	
8.	COMMON /FOR3SS/ IO, DELS, XBK(20), YBK(20), XON(500), YON(500), DYDXO(500)	J	0070	
9.	1), ALPHA(500), CAPPA(500), SON(500), P10180	J	0080	
10.	COMMON /SS/ NBDY1, NBDY2, TYPBDY, NRDYS	J	0090	
11.	DELSIN=DELS1	J	0100	
12.	DELS=DELS1	J	0110	
13.	KOUNT=0	J	0120	
14.	K=M-1	J	0130	
15.	KSTART=M	J	0140	
16.	X2=XIN(2)	J	0150	
17.	X3=XIN(3)	J	0160	
18.	Y2=YIN(2)	J	0170	
19.	Y3=YIN(3)	J	0180	
20.	SLOP2=(YIN(4)-Y3)/(XIN(4)-X3)	J	0190	
21.C		J	0200	
22.C	SETUP 4 X 4 MATRIX OF COEFFICIENTS	J	0210	
23.C		J	0220	
24.	AA(1,1)=1.0	J	0230	
25.	AA(1,2)=X2	J	0240	
26.	AA(1,3)=X2**2	J	0250	
27.	AA(1,4)=X2**3	J	0260	
28.	AA(2,1)=0.0	J	0270	
29.	AA(2,2)=1.0	J	0280	
30.	AA(2,3)=2.0*X2	J	0290	
31.	AA(2,4)=3.0*X2**2	J	0300	
32.	AA(3,1)=1.0	J	0310	
33.	AA(3,2)=X3	J	0320	
34.	AA(3,3)=X3**2	J	0330	
35.	AA(3,4)=X3**3	J	0340	
36.	AA(4,1)=0.0	J	0350	
37.	AA(4,2)=1.0	J	0360	
38.	AA(4,3)=2.0*X3	J	0370	
39.	AA(4,4)=3.0*X3**2	J	0380	
40.	DO 10 I1=1,4	J	0390	
41.	10 CONTINUE	J	0400	
42.C		J	0410	
43.C	SETUP VECTOR OF ORIGINAL CONSTANTS -- BB	J	0420	
44.C		J	0430	
45.	BB(1)=Y2	J	0440	
46.	BB(2)=(Y2-YIN(1))/(X2-XIN(1))	J	0450	
47.	BB(3)=Y3	J	0460	
48.	BB(4)=(YIN(4)-Y3)/(XIN(4)-X3)	J	0470	
49.	NSIM=4	J	0480	
50.	KSIM=0	J	0490	
51.	CALL SIMQ (AA,BB,NSIM,KSIM)	J	0500	
52.	D=BB(1)	J	0510	
53.	C=BB(2)	J	0520	
54.	A=BB(4)	J	0530	
55.	C=BB(2)	J	0540	
56.	B=BB(3)	J	0550	

57.	15	K=KSTART	J	0560
58.		KOUNT=KOUNT+1	J	0570
59.		XON(K+1)=YIN(2)	J	0580
60.		YON(K+1)=YIN(2)	J	0590
61.		DYDXO(K+1)=3.0*A*XON(K+1)**2+2.0*B*XON(K+1)+C	J	0600
62.		CAPPA(K+1)=(6.0*A*XON(K+1)+2.0*B)/((1.0+DYDXO(K+1)**2)**1.5)	J	0610
63.		ALPHA(K+1)=ATAN(DYDXO(K+1))	J	0620
64.		DS=DELS/(1.0+.2*TANH(ABS(CAPPA(K+1))))	J	0630
65.	20	K=K+1	J	0640
66.		DXKP1=DS/(SQRT(1.0+DYDXO(K)))	J	0650
67.		IF (XIN(3).LT.XIN(2)) DXKP1=-DXKP1	J	0660
68.		XON(K+1)=XON(K)+DXKP1	J	0670
69.		YON(K+1)=A*XON(K+1)**3+B*XON(K+1)**2+C*XON(K+1)+D	J	0680
70.		DYDXO(K+1)=3.0*A*XON(K+1)**2+2.0*B*XON(K+1)+C	J	0690
71.		CAPPA(K+1)=(6.0*A*XON(K+1)+2.0*B)/((1.0+DYDXO(K+1)**2)**1.5)	J	0700
72.		DS=DELS/(1.0+.2*TANH(ABS(CAPPA(K+1))))	J	0710
73.		ALPHA(K+1)=ATAN(DYDXO(K+1))	J	0720
74.		SON(K+1)=SON(K)+SQRT((XON(K+1)-XON(K))**2+(YON(K+1)-YON(K))**2)	J	0730
75.		IF (SLOP2.GT.1.0) GO TO 25	J	0740
76.		IF (XIN(4).GE.X3.AND.XON(K+1).GT.X3) GO TO 30	J	0750
77.		IF (XIN(4).LT.X3.AND.XON(K+1).LE.X3) GO TO 30	J	0760
78.		GO TO 20	J	0770
79.	25	IF (YIN(4).GE.Y3.AND.YON(K+1).GT.Y3) GO TO 30	J	0780
80.		IF (YIN(4).LT.Y3.AND.YON(K+1).LE.Y3) GO TO 30	J	0790
81.		GO TO 20	J	0800
82.	30	IF (KOUNT.GT.100) GO TO 55	J	0810
83.		DELSS=DELS	J	0820
84.		DSTEST=((XON(K+1)-XIN(3))**2+(YON(K+1)-YIN(3))**2)**.5	J	0830
85.		IF (ABS(DS-DSTEST).LT..01*DS) GO TO 35	J	0840
86.		IF (DSTEST.LT..01*DS) GO TO 40	J	0850
87.		IF (DSTEST-.5*DS) 50,45,45	J	0860
88.	35	K=K-1	J	0870
89.	40	XON(K+1)=XIN(3)	J	0880
90.		YON(K+1)=YIN(3)	J	0890
91.		GO TO 55	J	0900
92.	45	DELS=DELS+(DS-DSTEST)/FLOAT(K-1-KSTART)	J	0910
93.		IF (KOUNT.GE.10) DELS=(DELS+DELSS)/2.0	J	0920
94.		GO TO 15	J	0930
95.	50	DELS=DELS-DSTEST/FLOAT(K-KSTART)	J	0940
96.		IF (KOUNT.GE.10) DELS=(DELS+DELSS)/2.0	J	0950
97.		GO TO 15	J	0960
98.	55	DELS1=DS*1.2	J	0970
99.		IF (DELS1.GT.DELS) DELS1=DELS	J	0980
100.		WRITE (6,65)KOUNT,A,B,C,D	J	0990
101.		WRITE (6,70)DELSIN,DELS,DELS1,DSTEST	J	1000
102.		KEND=K+1	J	1010
103.		KSTART=KSTART+1	J	1020
104.		DO 60 I=KSTART,KEND	J	1030
105.		ALPHA(I)=ALPHA(I)/PI*180	J	1040
106.	60	CONTINUE	J	1050
107.		RETURN	J	1060
108.C			J	1070
109.C			J	1080
110.	65	FORMAT (1H0,2X,14,2X,10HITERATIONS,2X,4HA = ,1PE12.5,2X,4HB = ,1PE12.5,2X,4HC = ,1PE12.5,2X,4HD = ,1PE12.5)	J	1090
111.			J	1100
112.	70	FORMAT (3X,10HDELS IN = ,F8.5,3X,7HDELS = ,F8.5,3X,11HDELS OUT = ,J	J	1110
113.		1F8.5,3X,9HDSTEST = ,F8.5)	J	1120

-55-

114. END

J 1130

50.NTRPDC		07 OCT 76	14
1.	SUBROUTINE DNTRPC	R	0000
2.C.....	CALCULATION OF C COEFFICIENTS FOR DERIVATIVES OF DOUBLE	R	0010
3.C.....	3-POINT INTERPOLATION.	R	0020
4.	COMMON /NTRPC1/ L,I,A11,A12,A13,A14,A22,A23,A24,A33,A34,A44	R	0030
5.	COMMON /NTRPC3/ I1,I2,C1,C2,C3,C4	R	0040
6.	IF (L.LE.1) GO TO 25	R	0050
7.	IF (L-3) 20,15,10	R	0060
8.C.....	FOR DOUBLE 3-POINT INTERPOLATION.	R	0070
9.	1C C1=(A22+A33+A22)/A23*A33/A12/A13	R	0080
10.	C4=-(A33+A22+A33)/A23*A22/A34/A24	R	0090
11.	P=A23*A23	R	0100
12.	C2=-(A11+A33+A11)*A33/A12+(A33*A44+A22*A44+A22*A33)/A24)/P	R	0110
13.	C3=-(A44+A22+A44)*A22/A34+(A22*A11+A33*A11+A33*A22)/A13)/P	R	0120
14.	GO TO 30	R	0130
15.C.....	FOR SIMPLE 3-POINT INTERPOLATION.	R	0140
16.	15 C1=(A33+A22)/A12/A13	R	0150
17.	C2=-(A33+A11)/A12/A23	R	0160
18.	C3=-(A22+A11)/A13/A23	R	0170
19.	GO TO 30	R	0180
20.C.....	FOR 2-POINT INTERPOLATION.	R	0190
21.	20 C1=1.0/A12	R	0200
22.	C2=-C1	R	0210
23.	GO TO 30	R	0220
24.C.....	ONLY ONE TABLE VALUE GIVEN.	R	0230
25.	25 C1=0.0	R	0240
26.	30 I1=I	R	0250
27.	I2=I+L-1	R	0260
28.	RETURN	R	0270
29.	END	R	0280


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50.FIG                                07 OCT 76  14
1.      SUBROUTINE DRAW(KR, KK)      22  0000
2.C(11111 SUBROUTINE ADDED TO DRAW PICTURE OF INLET VIA CALCOMP PLOTTER. 22  0010
3.C(11111 CALLED ONCE FOR EACH SEGMENT 22  0020
4.C      22  0030
5.      DIMENSION X(200),Y(200)    22  0040
6.      COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS 22  0050
7.      COMMON /FORSSS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500) 22  0060
8.      1),ALPHA(500),CAPPA(500),SON(500),PI0180 22  0070
9.      COMMON/ LOT/XMIN,YMIN,ORD,EXEP,XX,YY,LPNCHO,IPLOTA,MM 22  0080
10.     COMMON/TOL/DACS(15),BAGX(15),ZAP(15),NZAP(15) 22  0090
11.     KL=KR+1 22  0100
12.     II=0 22  0110
13.     DO 20 I=1,KL 22  0120
14.     N=KK+I-1 22  0130
15.     IF (II.GE.200.OR.N.GT.500) GO TO 30 22  0140
16.C(11111 TEST EACH (X,Y) PT. EXCLUDE THOSE BEYOND (XX*EXEP+XMIN) INCHES 22  0150
17.     IF (XON(N)-XX*EXEP-XMIN) 10,10,20 22  0160
18.     10 IF (YON(N)-YY*ORD-YMIN) 15,15,20 22  0170
19.     15 II=II+1 22  0180
20.     X(II)=XON(N) 22  0190
21.     Y(II)=YON(N) 22  0200
22.     IF (II.NE.1.OR.TYPBDY.EQ.1.) GO TO 20 22  0210
23.C(11111 STORE CURVATURE VALUES OF SEGMENT'S FIRST PT. FOR USE WITH 22  0220
24.C SUBSEQUENT CURVATURE PLOTS. 22  0230
25.     MM=MM+1 22  0240
26.     BAGX(MM)=XON(N) 22  0250
27.     BAGS(MM)=SON(N) 22  0260
28.     ZAP(MM)=CAPPA(N) 22  0270
29.     NZAP(MM)=N 22  0280
30.     20 CONTINUE 22  0290
31.C(11111 DRAW A SEGMENT MARKER AT FIRST PT. OF SEGMENT 22  0300
32.     IF (XON(KK).GT.(XX*EXEP+XMIN).OR.YON(KK).GT.(YY*ORD+YMIN)) GO TO 222 0310
33.     *5 22  0320
34.     XSYM= (X(1)-XMIN)/EXEP 22  0330
35.     YSYM= (Y(1)-YMIN)/ORD 22  0340
36.     CALL SYMBOL(XSYM,YSYM,.2,1,0.,-1) 22  0350
37.     25 CALL LINE(X,Y,II,1,1,3,XMIN,EXEP,YMIN,ORD) 22  0360
38.     RETURN 22  0370
39.     30 WRITE (6,35)II,N 22  0380
40.     35 FORMAT(1H0,' SCIRCLE ERROR EXIT - DATA POINTS EXCEED 200 ON A SEG 22  0390
41.     10R EXCEED 500 ON TOTAL INLET - ' /218) 22  0400
42.     STOP 22  0410
43.     END 22  0420

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50.ZTRPD		37 OCT 76 14	
1.	COMPLEX FUNCTION DZTRP (A,F,X,NA)	P	0000
2.C.....	COMPLEX DERIVATIVE EVALUATION FOR DOUBLE 3-POINT INTERPOLATION.	P	0010
3.	COMPLEX F(NA)	P	0020
4.	COMMON /NTRPC2/ I1,I2,C(4)	P	0030
5.C.....	FIRST EVALUATE FUNCTION COEFFICIENTS.	P	0040
6.	CALL FNTRPA (A,X,NA)	P	0050
7.	CALL DNTRPC	P	0060
8.C.....	THEN EVALUATE FUNCTION VALUE.	P	0070
9.	DZTRP=0.0.	P	0080
10.	J=0	P	0090
11.	DO 10 I=I1,I2	P	0100
12.	J=J+1	P	0110
13.	10 DZTRP=DZTRP+C(J)*F(I)	P	0120
14.	RETURN	P	0130
15.	END	P	0140

50. ELLIPS

07 OCT 76 13

1.	SUBROUTINE ELLIPSE (K)	G	0000
2.C		G	0010
3.C	THIS SUBROUTINE FITS A SEGMENT OF AN ELLIPSE TO TWO ARBITRARILY	G	0020
4.C	ORIENTED STRAIGHT LINES NOT MORE THAN 90 DEGREES APART	G	0030
5.C		G	0040
6.	COMMON /MAIN/ XIN(10),YIN(10),DELSHX,PI02,DELS1,INHUB	G	0050
7.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	G	0060
8.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	G	0070
9.	COMMON /SS/ NBOY1,NBOY2,TYPBOY,NBOYS	G	0080
10.C		G	0090
11.C	TRANSLATE INPUT BREAK POINTS SO THAT POINT NO. 2 BECOMES	G	0100
12.C	THE ORIGIN	G	0110
13.C		G	0120
14.	DELSIN=DELS1	G	0130
15.	KOUNT=0	G	0140
16.	DELS=DELS1	G	0150
17.	PI=3.141592653	G	0160
18.	K=K+1	G	0170
19.	KSTART=K	G	0180
20.	X2=XIN(2)	G	0190
21.	Y2=YIN(2)	G	0200
22.	DO 10 I=1,4	G	0210
23.	XIN(I)=XIN(I)-X2	G	0220
24.	10 YIN(I)=YIN(I)-Y2	G	0230
25.C		G	0240
26.C	ROTATE THE TRANSLATED BREAK POINTS SO THAT THE SLOPE OF THE	G	0250
27.C	FIRST STRAIGHT LINE IS ZERO	G	0260
28.C		G	0270
29.	IF (XIN(2).NE.XIN(1)) GO TO 15	G	0280
30.	SLOPE=99999.	G	0290
31.	PHI=-PI02	G	0300
32.	IF (YIN(1).GT.YIN(2)) PHI=PI02	G	0310
33.	GO TO 20	G	0320
34.	15 SLOPE=(YIN(2)-YIN(1))/(XIN(2)-XIN(1))	G	0330
35.	PHI=ATAN(SLOPE)	G	0340
36.	IF (XIN(1).LT.XIN(2)) PHI=PI+ATAN(SLOPE)	G	0350
37.	20 DO 25 I=1,4	G	0360
38.	XA=XIN(I)	G	0370
39.	XIN(I)=XA*COS(PHI)+YIN(I)*SIN(PHI)	G	0380
40.	25 YIN(I)=-XA*SIN(PHI)+YIN(I)*COS(PHI)	G	0390
41.C		G	0400
42.C	DETERMINE THE ELLIPSE	G	0410
43.C		G	0420
44.	IF (XIN(4).NE.XIN(3)) GO TO 30	G	0430
45.	B=YIN(3)	G	0440
46.	A=ABS(XIN(3))	G	0450
47.	PHIAB=PI02	G	0460
48.	GO TO 35	G	0470
49.	30 SLOP2=(YIN(4)-YIN(3))/(XIN(4)-XIN(3))	G	0480
50.	IF (SLOP2.LE.2.0*YIN(3)/XIN(3)) GO TO 135	G	0490
51.	C3=XIN(3)*SLOP2/YIN(3)	G	0500
52.	PHIAB=2.0*ATAN(SQRT((C3-2.0)/C3))	G	0510
53.	A=-XIN(3)/SIN(PHIAB)	G	0520
54.	B=YIN(3)/(1.0-COS(PHIAB))	G	0530
55.	35 THETMX=PHIAB-PI02	G	0540
56.	THETXD=THETMX/PI0180	G	0550

57.	WRITE (6,140)A,B,XIN(1),VIN(1),PHI,THMXO	G	0560
58.C		G	0570
59.C	INITIALIZE THE FIRST POINT ON THE ELLIPSE	G	0580
60.C		G	0590
61.	40 K=KSTART	G	0600
62.	XON(K+1)=XIN(2)	G	0610
63.	YON(K+1)=VIN(2)	G	0620
64.	CAPPA(K+1)=-R/(A**2)	G	0630
65.	ALPHA(K+1)=C.C	G	0640
66.	DYDXO(K+1)=D.C	G	0650
67.	KOUNT=KOUNT+1	G	0660
68.	THET=-PI/2	G	0670
69.	DSSAVE=DELS	G	0680
70.	DS=DELS/(1.0+.2*TANH(ABS(CAPPA(I))))	G	0690
71.	DTHET=DS/ABS(A)	G	0700
72.	THET=THET+DTHET	G	0710
73.C		G	0720
74.C	GENERATE THE POINTS ON THE ELLIPSE	G	0730
75.C		G	0740
76.	45 K=K+1	G	0750
77.	50 XON(K+1)=-A*COS(THET)	G	0760
78.	YON(K+1)=B*(1.0+SIGN(THET))	G	0770
79.	SON(K+1)=SON(K)+SQRT((XON(K+1)-XON(K))**2+(YON(K+1)-YON(K))**2)	G	0780
80.	IF (ABS(SON(K+1)-SON(K)).GT.1.05*DS) GO TO 55	G	0790
81.	IF (ABS(SON(K+1)-SON(K)).LT..95*DS) GO TO 60	G	0800
82.	GO TO 65	G	0810
83.	55 THET=THET-.02*DTHET	G	0820
84.	GO TO 50	G	0830
85.	60 THET=THET+.02*DTHET	G	0840
86.	GO TO 50	G	0850
87.	65 IF (THET.EQ.C.C) GO TO 70	G	0860
88.	DYDXO(K+1)=B*COTAN(THET)/A	G	0870
89.	ALPHA(K+1)=ATAN(DYDXO(K+1))	G	0880
90.	GO TO 75	G	0890
91.	70 DYDXO(K+1)=99.999.	G	0900
92.	ALPHA(K+1)=PI/2	G	0910
93.	75 CAPPA(K+1)=-A*B/(B*B*COS(THET)**2+A*A*SIN(THET)**2)**1.5	G	0920
94.	DS=DELS/(1.0+.2*TANH(ABS(CAPPA(I))))	G	0930
95.	IF (ABS(DS-DELS).GT..20*DELS) DS=DELS+SIGN(.20*DELS,DS-DELS)	G	0940
96.	DSSAVE=DS	G	0950
97.	80 DTHET=DS/SQRT(B*B*COS(THET)**2+A*A*SIN(THET)**2)	G	0960
98.	DTS=DTHET	G	0970
99.	THET=THET+DTHET/2.0	G	0980
100.	DTHET=DS/SQRT(B*B*COS(THET)**2+A*A*SIN(THET)**2)	G	0990
101.	IF (ABS(DTHET-DTS).LT..001*DTS) GO TO 85	G	1000
102.	GO TO 80	G	1010
103.	85 IF (THET.LL.THETMX-DTHET/2.0) GO TO 45	G	1020
104.	IF (KOUNT.GT.100) GO TO 115	G	1030
105.	DELS=DFLS	G	1040
106.	DSTEST=((XON(K+1)-XIN(3))**2+(YON(K+1)-VIN(3))**2)**.5	G	1050
107.	IF (ABS(DS-DSTEST).LT..01*DS) GO TO 90	G	1060
108.	IF (DSTEST.GT.DS) GO TO 110	G	1070
109.	IF (DSTEST.LT..01*DS) GO TO 95	G	1080
110.	IF (DSTEST-.5*DS) 105,90,100	G	1090
111.	90 K=K+1	G	1100
112.	95 XON(K+1)=XIN(3)	G	1110
113.	YON(K+1)=VIN(3)	G	1120

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114.	GO TO 115	G	1130
115.	100 DELS=(FLOAT(K+1-KSTART)*DELS+DSTEST)/FLOAT(K+2-KSTART)	G	1140
116.	IF (KOUNT.GE.10) DELS=(DELS+DELS1)/2.0	G	1150
117.	GO TO 40	G	1160
118.	105 DELS=DELS+DSTEST/FLOAT(K+2-KSTART)	G	1170
119.	IF (KOUNT.GE.10) DELS=(DELS+DELS1)/2.0	G	1180
120.	GO TO 40	G	1190
121.	110 DELS=.8*DELS	G	1200
122.	GO TO 40	G	1210
123.	115 DELS1=DELS*1.2	G	1220
124.	IF (DELS1.GT.DELS) DELS1=DELS	G	1230
125.	WRITE (6,145)KOUNT	G	1240
126.	WRITE (6,155)DELS1N,DELS,DELS1,DSTEST	G	1250
127.	KEND=K+1	G	1260
128.	KSTART=KSTART+1	G	1270
129.C		G	1280
130.C	ROTATE AND TRANSLATE BACK	G	1290
131.C		G	1300
132.	DO 130 KROT=KSTART,KEND	G	1310
133.	XA=XON(KROT)	G	1320
134.	XON(KROT)=XA*COS(PHI)-YON(KROT)*SIN(PHI)+X2	G	1330
135.	YON(KROT)=XA*SIN(PHI)+YON(KROT)*COS(PHI)+Y2	G	1340
136.	ALPHA(KROT)=ALPHA(KROT)+PHI	G	1350
137.	IF (ALPHA(KROT).EQ.PI02) GO TO 120	G	1360
138.	DYDX0(KROT)=TAN(ALPHA(KROT))	G	1370
139.	GO TO 125	G	1380
140.	120 DYDX0(KROT)=99999.	G	1390
141.	125 ALPHA(KROT)=ALPHA(KROT)/PI0180	G	1400
142.	130 CONTINUE	G	1410
143.	RETURN	G	1420
144.	135 WRITE (6,150)SLOP2,XIN(3),YIN(3)	G	1430
145.	STOP	G	1440
146.C		G	1450
147.C		G	1460
148.	140 FORMAT (1HD,10X,4HA =,1PE10.3,5X,4HB =,1PE10.3,5X,5HXD =,1PE10.3	G	1470
149.	13,5X,7HYD =,1PE10.3/9X,7HPHI =,1PE10.3,5X,9HTHETPX =,1PE10.3G	G	1480
150.	2)	G	1490
151.	145 FORMAT (11X,13,2X,13HITERATIONS---)	G	1500
152.	150 FORMAT (1HD,10X,42HCOMBINATION OF SLOPE, X , Y NOT COMPATIBLE/5X,9G	G	1510
153.	1HSLOPE2 =,F7.3,3X,9HXIN(3) =,F7.3,3X,9HYIN(3) =,F7.3)	G	1520
154.	155 FORMAT (11X,10HDELS IN =,F8.5,3X,7HDELS =,F8.5,3X,11HDELS OUT =	G	1530
155.	1,F8.5,3X,9HDSTEST =,F8.5)	G	1540
156.	END	G	1550

50.FNSTRH		24 NOV 76	16
1.	SUBROUTINE FNSTRH (K)	C	0000
2.C		C	0010
3.C	FINAL STRAIGHT SEGMENT ON THE HUB AND SHROUD	C	0020
4.C		C	0030
5.	COMMON /MAIN/ XIN(10),YIN(10),DELSMX,PI02,DELS1,IHUB	C	0040
6.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	C	0050
7.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	C	0060
8.	COMMON /SS/ NRDY1,NBODY2,TYPBDY,NROYS	C	0070
9.	COMMON /FNST/,NFIRST	C	0080
10.	NFIRST=K	C	0090
11.	DS=DELS1	C	0100
12.	DELSTR=DELSMX	C	0110
13.	YTEST=YIN(2)-YIN(1)	C	0120
14.	XTEST=XIN(2)-XIN(1)	C	0130
15.	ASIGN=1.0	C	0140
16.	IF (XTEST.LT.C.O) ASIGN=-1.0	C	0150
17.	ISTAR=0	C	0160
18.	SSEG=SQRT(XTEST**2+YTEST**2)	C	0170
19.	IF (XTEST.EQ.C.O) GO TO 10	C	0180
20.	IF (YTEST.EQ.C.O) GO TO 15	C	0190
21.	DYDXC=YTEST/XTEST	C	0200
22.	ALPHAC=ATAN(YTEST/XTEST)	C	0210
23.	SINAL=SIN(ALPHAC)	C	0220
24.	COSAL=COS(ALPHAC)	C	0230
25.	GO TO 20	C	0240
26.	10 DYDXC=SIGN(99999.,YTEST)	C	0250
27.	ALPHAC=SIGN(PI02,YTEST)	C	0260
28.	SINAL=1.0	C	0270
29.	COSAL=0.0	C	0280
30.	GO TO 20	C	0290
31.	15 DYDXC=C.O	C	0300
32.	ALPHAC=0.0	C	0310
33.	SINAL=0.0	C	0320
34.	COSAL=1.0	C	0330
35.	20 DYDXO(K+1)=DYDXC	C	0340
36.	ALPHA(K+1)=ALPHAC	C	0350
37.	IF (DS.GT.DEFSMX) GO TO 25	C	0360
38.	GO TO 45	C	0370
39.	25 IF (ISTAR.NE.O) GO TO 45	C	0380
40.	DSLAST=DS	C	0390
41.	XON(K+1)=XON(K)	C	0400
42.	YON(K+1)=YON(K)	C	0410
43.	ICOUNT=0	C	0420
44.	30 XSAVE=XON(K+1)-XIN(1)	C	0430
45.	YSAVE=YON(K+1)-YIN(1)	C	0440
46.	SSTAR=SQRT(XSAVE**2+YSAVE**2)	C	0450
47.	ASTAR=(SSEG-SSTAR)/DELSTR	C	0460
48.	ATEST=ASTAR-FLOAT(IFIX(ASTAR))	C	0470
49.	IF (ATEST.GT..5) ASTAR=ASTAR+1.0	C	0480
50.	NSTAR=IFIX(ASTAR)	C	0490
51.	ISTAR=1	C	0500
52.	IF (NSTAR.EQ.O) GO TO 35	C	0510
53.	DS=(SSEG-SSTAR)/FLOAT(NSTAR)	C	0520
54.	IF (DS.GT.DSLAST) GO TO 35	C	0530
55.	IF (ICOUNT.GT.O) K=K+1	C	0540
56.	GO TO 45	C	0550

57.	35	K=K-1	C	0560
58.		IF (K.GT.NFIRST) GO TO 40	C	0570
59.		K=NFIRST	C	0580
60.		CALL STRAIT (K,0)	C	0590
61.		K=K-1	C	0600
62.		GO TO 50	C	0610
63.	40	DSLST=SQRT((XON(K-1)-XON(K))**2+(YON(K-1)-YON(K))**2)*1.2	C	0620
64.		DELSTR=DSLST	C	0630
65.		ICOUNT=ICOUNT+1	C	0640
66.		GO TO 30	C	0650
67.	45	XON(K+1)=XON(K)+ASIGN*DS*COSAL	C	0660
68.		YON(K+1)=YON(K)+ASIGN*DS*SINAL	C	0670
69.		SON(K+1)=SON(K)+SQRT((XON(K+1)-XON(K))**2+(YON(K+1)-YON(K))**2)	C	0680
70.		CAPPA(K+1)=0.0	C	0690
71.		IF (ABS(XON(K+1)-XIN(2)).LE..001*DS.AND.XTEST.NE.0.0) GO TO 50	C	0700
72.		IF (ABS(YON(K+1)-YIN(2)).LE..001*DS.AND.XTEST.EQ.0.0) GO TO 50	C	0710
73.	C		C	0720
74.	C(11111	IS THE CURRENT POINT PAST THE NEAREST ENDPOINT OF SEGMENT (PRC	C	0730
75.	C(11111	VIOUS TESTS WERE ONLY FOR ABSOLUTE PROXIMITY TO ENDPOINT)	C	0740
76.		IF (ABS(YON(K+1)-YIN(1)).GT.ABS(YTEST)) GO TO 50	C	075
77.		IF (ABS(XON(K+1)-XIN(1)).GT.ABS(XTEST)) GO TO 50	C	076
78.		K=K+1	C	0770
79.		IF (ISTAR.EQ.0) DS=DS*1.2	C	0780
80.		GO TO 20	C	0790
81.	50	DELST=DELS	C	0800
82.		XON(K+1)=XIN(2)	C	0810
83.		YON(K+1)=YIN(2)	C	0820
84.		NBDY1=K+1	C	0830
85.		K=K+1	C	0840
86.		DO 55 KAL=NFIRST,K	C	0850
87.	55	ALPHA(KAL)=ALPHA(KAL)/PI0180	C	0860
88.		RETURN	C	0870
89.		END	C	0880

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50. NTRPF	07 OCT 76	14
1. FUNCTION FTRP (A,F,X,NA)	S	0000
2.C....FUNCTION EVALUATION FOR DOUBLE 3-POINT INTERPOLATION.	S	0010
3. REAL F(NA)	S	0020
4. COMMON /NTRPC2/ I1,I2,C(4)	S	0030
5.C....FIRST EVALUATE FUNCTION COEFFICIENTS.	S	0040
6. CALL FTRPA (A,X,NA)	S	0050
7. CALL FTRPC	S	0060
8.C....THEN EVALUATE FUNCTION VALUE.	S	0070
9. ENTRY FTRP1 (F)	S	0080
10. FTRP=D.0	S	0090
11. J=0	S	0100
12. DO 10 I=I1,I2	S	0110
13. J=J+1	S	0120
14. 10 FTRP=FTRP+C(J)*F(I)	S	0130
15. RETURN	S	0140
16. END	S	0150

50.NTRPFA		07 OCT 76	14
1.	SUBROUTINE NTRPA (A,X,NA)	V	0000
2.C.....	COMMON SUPROUTINE EVALUATES A COEFFICIENTS IN DOUBLE	V	0010
3.C.....	3-POINT INTERPOLATIONS.	V	0020
4.C	L=NO. OF POINTS IN THE FIT	V	0030
5.C	I=INDEX TO FIRST POINT	V	0040
6.	REAL A(NA)	V	0050
7.	COMMON /NTRPC/ L,I,A11,A12,A13,A14,A22,A23,A24,A33,A34,A44	V	0060
8.C.....	GET I AND L BY TABLE LOOK-UP.	V	0070
9.	L=LIMIT (1,NA,3)	V	0080
10.	M=MAX(1,NA-2)	V	0090
11.	CALL TLU (A,X,NA,J)	V	0100
12.	IF (J.EQ.LIMIT(2,J,M)) L=4	V	0110
13.	I=LIMIT(1,J-1,M)	V	0120
14.C.....	CALCULATE A-ARRAY.	V	0130
15.	A11=A(I)	V	0140
16.	A22=A(I+1)	V	0150
17.	A23=A(I+2)	V	0160
18.	IF (L.NE.4) IF (L-2) 20,15,10	V	0170
19.	A44=A(I+3)	V	0180
20.	A14=A11-A44	V	0190
21.	A24=A22-A44	V	0200
22.	A3=A33-A44	V	0210
23.	A=X-A44	V	0220
24.	10 A13=A11-A33	V	0230
25.	A23=A22-A33	V	0240
26.	A33=X-A33	V	0250
27.	15 A12=A11-A22	V	0260
28.	A22=X-A22	V	0270
29.	A11=X-A11	V	0280
30.	20 RETURN	V	0290
31.	END	V	0300

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50.NTRPFC		07 OCT 76	14
1.	SUBROUTINE FNTRPC	U	0000
2.C....	CALCULATION OF C COEFFICIENTS FOR FUNCTION VALUES BY DOUBLE	U	0010
3.C....	3-POINT INTERPOLATION.	U	0020
4.	COMMON /NTRPC1/L,I,A11,A12,A13,A14,A22,A23,A24,A33,A34,A44	U	0030
5.	COMMON /NTRPC2/ I1,I2,C1,C2,C3,C4	U	0040
6.	IF (L.LE.1) GO TO 25	U	0050
7.	IF (L-3) 20,15,10	U	0060
8.C....	FOR DOUBLE 3-POINT INTERPOLATION.	U	0070
9.	10 C1=A33/A23+A22/A12+A33/A13	U	0080
10.	C4=-A22/A23+A33/A34+A22/A24	U	0090
11.	P2=A33/A23+A11/A23	U	0100
12.	P3=A22/A23+A44/A23	U	0110
13.	C2=-A33*(P2/A12+P3/A24)	U	0120
14.	C3=A22*(P3/A34+P2/A13)	U	0130
15.	GO TO 30	U	0140
16.C....	FOR SIMPLE 3-POINT INTERPOLATION.	U	0150
17.	15 C1=A22/A12+A33/A13	U	0160
18.	C2=-A11/A12+A33/A23	U	0170
19.	C3=A11/A13+A22/A23	U	0180
20.	GO TO 30	U	0190
21.C....	FOR 2-POINT INTERPOLATION.	U	0200
22.	20 C1=A22/A12	U	0210
23.	C2=-A11/A12	U	0220
24.	GO TO 30	U	0230
25.C....	ONLY ONE TABLE VALUE GIVEN.	U	0240
26.	25 C1=1.0	U	0250
27.	30 I1=I	U	0260
28.	I2=I+L-1	U	0270
29.	RETURN	U	0280
30.	END	U	0290

[illegible]

57.	DFDQA2 = YOBTO2 * LOGYOB(2)	I	0560
58.	F2 = XOATP2 * YOBTO2 - 1.	I	0570
59.	DFDPA2 = XOATP2 * LOGXOA(2)	I	0580
60.	40 QN = (F1 * DFDPA2 / (DFDQA2 * DFDPA1) - F2 / DFDQA2) / (1. - DFDPA2 * DFDQA1 / (DFI	I	0590
61.	1DPA1 * DFDQA2)) + 0	I	0600
62.	PN = ((Q - QN) * DFDQA1 - F1) / DFDPA1 + P	I	0610
63.	45 TESTP = ABS(PN - P) / P - TOL	I	0620
64.	TESTQ = ABS(QN - Q) / Q - TOL	I	0630
65.	Q = QN	I	0640
66.	P = PN	I	0650
67.	IF (TESTP.GT.0..OR.TESTQ.GT.0.) GO TO 25	I	0660
68.	50 RETURN	I	0670
69.	55 PN = -F1 / DFDPA1 + P	I	0680
70.	TESTP = ABS(PN - P) / P - TOL	I	0690
71.	P = PN	I	0700
72.	IF (TESTP) 50,25,25	I	0710
73.	60 QN = -F1 / DFDQA1 + Q	I	0720
74.	TESTQ = ABS(QN - Q) / Q - TOL	I	0730
75.	Q = QN	I	0740
76.	IF (TESTQ) 50,25,25	I	0750
77.	65 DFDQA1 = YOBTO1 * LOGYOB(1)	I	0760
78.	PN = -F1 / (DFDPA1 * DFDQA1) + P	I	0770
79.	TESTP = ABS(PN - P) / P - TOL	I	0780
80.	P = PN	I	0790
81.	Q = P	I	0800
82.	IF (TESTP) 50,25,25	I	0810
83.	70 DYDX = (Y(2) - Y1) / (X(2) - X1)	I	0820
84.	F2 = DYDX * P * XOATP1 * Y(1) / Q / YOBTO1 * X(1)	I	0830
85.	EOCALD = - P * XOATP1 * Y(1) / Q / YOBTO1 * X(1)	I	0840
86.	DFDQA2 = - (ALOG(B) - 1. / Q - ALOG(Y(1))) * EOCALD	I	0850
87.	DFDPA2 = - (1. / P - ALOG(A) + ALOG(X(1))) * EOCALD	I	0860
88.	IF (LL.EQ.6) GO TO 75	I	0870
89.	GO TO 40	I	0880
90.	75 LOCALD = - P * XOATP1 * Y(1) / Q / YOBTO1 * X(1)	I	0890
91.	G = F2	I	0900
92.	DGDP = DFDPA2	I	0910
93.	DGDQ = DFDQA2	I	0920
94.	H = EOCALD * ((P - 1.) / X(1) + ((1. - Q) / Y(1)) * EOCALD)	I	0930
95.	DHDP = EOCALD * ((P - 1.) / X(1) + ((1. - Q) / Y(1)) * EOCALD) * (1. / P - ALOG(A) + AL	I	0940
96.	LOG(X(1))) + EOCALD * (1. / X(1) + ((1. - Q) / Y(1)) * EOCALD * (1. / P - ALOG(A) + AL	I	0950
97.	2 * (X(1))))	I	0960
98.	DHDO = EOCALD * ((P - 1.) / X(1) + ((1. - Q) / Y(1)) * EOCALD) * (-1. / Q + ALOG(B) - A	I	0970
99.	1 * LOG(Y(1))) + EOCALD * (-EOCALD / Y(1) + ((1. - Q) / Y(1)) * EOCALD * (-1. / Q + AL	I	0980
100.	2 * (-ALOG(Y(1))))	I	0990
101.	DFDY = Q / Y(1) * YOBTO1	I	1000
102.	IF (INFLEC.EQ.1) DFDY = P / X(1) * XOATP1	I	1010
103.	DGDY = EOCALD * (Q - 1.) / Y(1)	I	1020
104.	IF (INFLEC.EQ.1)	I	1030
105.	1 DGDY = EOCALD * (1. - P) / X(1)	I	1040
106.	EOCAL2 = 2. * EOCALD	I	1050
107.	DHDOY = EOCALD * ((P - 1.) / X(1) + ((1. - Q) / Y(1)) * EOCAL2) * (1. - Q) / Y(1) * EOCAL	I	1060
108.	1 * (Q - 1.) / Y(1) / Y(1))	I	1070
109.	IF (INFLEC.EQ.1)	I	1080
110.	1 DHDOY = EOCALD / X(1) * (P - 1.) * (P - 2.) / X(1) + 2. * EOCALD * (1. - Q) / Y(	I	1090
111.	1 * (1))	I	1100
112.	WRONSK = DFDPA1 * (DGDQ * DHDOY - DGDY * DHDO) - DFDQA1 * (DGDP * DHDOY - DGDY * DHDP) +	I	1110
113.	1 DFDY * (DGDP * DHDO - DGDQ * DHDP)	I	1120

114.	QN=Q*(F1*(DGDQ*DHDY-DGDY*DHDQ)-G*(DFDQAI*DHDY-DFDY*DHDQ)-H*(DFDQAI	1130
115.	1*DGDY-DFDY*DGDQ))/WRONSK	I 1140
116.	PN=P*(1-F1*(DGDQ*DHDY-DGDY*DHDQ)+G*(DFDQAI*DHDY-DFDY*DHDQ)-H*(DFDQAI	1150
117.	1*DGDY-DFDY*DGDQ))/WRONSK	I 1160
118.	YN=Y(1)+(DHDQ*(P-PN)+DHDQ*(Q-QN)-H)/DHDY	I 1170
119.	IF(INFLEC.EQ.1)	I 1180
120.	YN=X(1)+(DHDQ*(P-PN)+DHDQ*(Q-QN)-H)/DHDY	I 1190
121.	TESTY=ABS(YN-Y(1))/Y(1) - 1.E-05	I 1200
122.	IF(INFLEC.EQ.1)	I 1210
123.	TESTY=ABS(YN-X(1))/X(1) - 1.E-05	I 1220
124.	IF(INFLEC.NE.1) Y(1)=YN	I 1230
125.	IF(INFLEC.EQ.1)	I 1240
126.	Y(1)=YN	I 1250
127.	IF (TESTY) 45,45,80	I 1260
128.	80 Q=QN	I 1270
129.	P=PN	I 1280
130.	60 TO 25	I 1290
131.	85 FORMAT(1H0,42H THIS POINT IS OUTSIDE THE MAGIC TRIANGLE,,2E15.4/	I 1300
132.	2 52HI	I 1310
133.	1 THIS CONDITION IS NOT VALID FOR ANY CASE. REVISE)	I 1320
134.	90 FORMAT(1H0,42H THIS POINT IS BELOW THE MAGIC TRIANGLE,,2E15.4/52I	I 1330
135.	1H THIS CONDITION IS VALID ONLY FOR THE BISUPERELLIPTIC WITH INFI	I 1340
136.	ELFCTIONIP OR Q LESS THAN 1.). SUCH A CURVE HAS BEEN GENERATED)	I 1350
137.	137C	I 1360
138.	END	I 1370

50.FRSTS		24 NOV 76	09
1.	SUBROUTINE FRSTSH (K)	0	0000
2.C		0	0010
3.C	FIRST STRAIGHT SEGMENT SHROUD	0	0020
4.C		0	0030
5.C	IF THERE IS NO HUB INTERCHANGE POINTS (X1,Y1) AND (X2,Y2)	0	0040
6.C	AND TREAT LIKE FINAL STRAIGHT SECTION ON THE HUB,	0	0050
7.C	THEN REVERSE XON AND YON ARRAYS	0	0060
8.C		0	0070
9.C		0	0080
10.	COMMON /MAIN/ XIN(10),YIN(10),DELSHX,PT02,DELS1,IHUB	0	0090
11.	COMMON /FOR3SS/ID,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDX0(500)	0	0100
12.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	0	0110
13.	COMMON /SS/ NR0Y1,NR0Y2,TYPBDY,NR0YS	0	0120
14.	COMMON /FNST/ NFIRST	0	0130
15.	DIMENSION XA(2), YA(2), DSV(500), ASV(500), XSV(500), YSV(500), SSV	0	0140
16.	1V(500)	0	0150
17.	SON(K)=0.0	0	0160
18.	IF (IHUB.EQ.1) GO TO 25	0	0170
19.	DO 10 I=1,2	0	0180
20.	XA(I)=XIN(I)	0	0190
21.	10 YA(I)=YIN(I)	0	0200
22.	XIN(1)=XA(2)	0	0210
23.	XIN(2)=XA(1)	0	0220
24.	YIN(1)=YA(2)	0	0230
25.	YIN(2)=YA(1)	0	0240
26.	NFB2=K	0	0250
27.	YON(K)=YIN(1)	0	0260
28.	XON(K)=XIN(1)	0	0270
29.	CALL FNSTRH (K)	0	0280
30.	KSV=K	0	0290
31.	DO 15 J=NFB2, KSV	0	0300
32.	KSR=KSV+1-J	0	0310
33.	DSV(KSR)=DYDX0(I)	0	0320
34.	ASV(KSR)=ALPHA(I)	0	0330
35.	XSV(KSR)=XON(I)	0	0340
36.	YSV(KSR)=YON(I)	0	0350
37.	15 SSV(I) =SON(I)	0	0360
38.	DO 20 I=NFB2, KSV	0	0370
39.	DYDX0(I)=DSV(I)	0	0380
40.	ALPHA(I)=ASV(I)	0	0390
41.	XON(I)=XSV(I)	0	0400
42.	YON(I)=YSV(I)	0	0410
43.	SON(I)=SSV(KSV)-SSV(KSV+1-I)	0	0420
44.	CAPPA(I)=0.0	0	0430
45.	20 CONTINUE	0	0440
46.	DELS1=ABS(SON(KSV)-SON(KSV-1))	0	0450
47.	NB0Y1=0	0	0460
48.	RETURN	0	0470
49.C		0	0480
50.C	IF THERE IS A HUB, USE X VALUES FROM FINAL STRAIGHT	0	0490
51.C	SECTION ON THE HUB FOR FIRST STRAIGHT SECTION ON	0	0500
52.C	SHROUD	0	0510
53.C		0	0520
54.	25 XTEST=XIN(1)-XIN(2)	0	0530
55.	YTEST=YIN(1)-YIN(2)	0	0540
56.	IF (XTEST.EQ.0.0) GO TO 30	0	0550

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57.	DYDXC=YTEST/XTEST	0	0560
58.	ALPHAC=ATAN2(YTEST,XTEST)	0	0570
59.	GO TO 35	0	0580
60.	30 DYDXC=99999.	0	0590
61.	ALPHAC=PI/2	0	0600
62.	35 K=K-1	0	0610
63.	NBDC=NBDY1	0	0620
64.	IF (TYBDY.EQ.3.0.AND.NBDYS.EQ.3) NBDC=NBDY2	0	0630
65.	DO 50 I=NFIRST,NBDC	0	0640
66.	KEEP=NBDC+NFIRST-I	0	0650
67.	XON(K+1)=XON(KEEP)	0	0660
68.	DYDXO(K+1)=DYDXC	0	0670
69.	ALPHA(K+1)=ALPHAC	0	0680
70.	IF (I.EQ.NFIRST) GO TO 40	0	0690
71.	YON(K+1)=YON(K)+(XON(K+1)-XON(K))*DYDXC	0	0700
72.	SON(K+1)=SON(K)+(XON(K)-XON(K+1))/COS(ALPHAC)	0	0710
73.	GO TO 45	0	0720
74.	40 YON(K+1)=YIN(1)+(XON(K+1)-XIN(1))*DYDXC	0	0730
75.	45 CAPPA(K+1)=0.0	0	0740
76.	ALPHA(K+1)=ALPHA(K+1)/PI/180	0	0750
77.	K=K+1	0	0760
78.	50 CONTINUE	0	0770
79.	DELS1=SON(K)-SON(K-1)	0	0780
80.	RETURN	0	0790
81.	END	0	0800

50.ZTRPF		07 OCT 76	14
1.	COMPLEX FUNCTION FZTRP (A,F,X,NA)	T	0000
2.C.....	COMPLEX FUNCTION EVALUATION BY DOUBLE 3-POINT INTERPOLATION.	T	0010
3.	COMPLEX F(NA)	T	0020
4.	COMMON /NTRPC2/ I1,I2,C(4)	T	0030
5.C.....	FIRST EVALUATE FUNCTION COEFFICIENTS.	T	0040
6.	CALL FNTRPA (A,X,NA)	T	0050
7.	CALL FNTRPC	T	0060
8.C.....	THEN EVALUATE FUNCTION VALUE.	T	0070
9.	FZTRP=0.0	T	0080
10.	J=0	T	0090
11.	DO 10 I=I1,I2	T	0100
12.	J=J+1	T	0110
13.	10 FZTRP=FZTRP+C(J)*F(I)	T	0120
14.	RETURN	T	0130
15.	END	T	0140

SO.LEM)		07 OCT 76	13
1.	SUBROUTINE LEM (K)	L	0000
2.C		L	0010
3.C	SUBROUTINE TO CALCULATE POINTS ON A LEMNISCATE	L	0020
4.C		L	0030
5.	COMMON /FOR3SS/ID,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	L	0040
6.	1),ALPHA(500),CAPPA(500),SON(500),PIO180	L	0050
7.	COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS	L	0060
8.	COMMON /MAIN/ XIN(10),YIN(10),DELSMX,PIO2,DELS1,IHUB	L	0070
9.	DELSIN=DELS1	L	0080
10.	K=K-1	L	0090
11.	KSTART=K	L	0100
12.	DELS=DELS1	L	0110
13.	KOUNT=0	L	0120
14.	IF (YIN(1).EQ.YIN(2)) GO TO 30	L	0130
15.	IF (XIN(1).EQ.XIN(2)) GO TO 10	L	0140
16.	SLOPE=(YIN(2)-YIN(1))/(XIN(2)-XIN(1))	L	0150
17.	AROT=-ATAN(SLOPE)	L	0160
18.	GO TO 15	L	0170
19.	10 SLOPE=99999.	L	0180
20.	AROT=-PIO2	L	0190
21.	15 DO 20 IROT=1,3	L	0200
22.	XN=XIN(IROT)	L	0210
23.	XIN(IROT)=XN*COS(AROT)-YIN(IROT)*SIN(AROT)	L	0220
24.	20 YIN(IROT)=XN*SIN(AROT)+YIN(IROT)*COS(AROT)	L	0230
25.	25 K=KSTART	L	0240
26.	30 XON(K+1)=XIN(2)	L	0250
27.	THETMX=ATAN(ABS((YIN(3)-YIN(2))/(XIN(3)-XIN(2))))	L	0260
28.	A=SQRT(((XIN(3)-XIN(2))**2+(YIN(3)-YIN(2))**2)/2.0*SIN(2.0*THETMX)	L	0270
29.	1)))	L	0280
30.	YON(K+1)=YIN(2)	L	0290
31.	CAPPA(K+1)=0.0	L	0300
32.	DYDXO(K+1)=0.0	L	0310
33.	ALPHA(K+1)=0.0	L	0320
34.	KOUNT=KOUNT+1	L	0330
35.	DSSAVF=DELS	L	0340
36.	DS=DELS	L	0350
37.	DTHET=DS**2/A**2	L	0360
38.	THET=DTHET*.5	L	0370
39.	35 R=A*SQRT(2.0*SIN(2.0*THET))	L	0380
40.	OSCHEK=R*COS(THET)	L	0390
41.	IF (OSCHEK.GT.1.1*DS) GO TO 40	L	0400
42.	IF (OSCHEK.LT..9*DS) GO TO 45	L	0410
43.	DELS=DS	L	0420
44.	GO TO 50	L	0430
45.	40 THET=THET-.02*DTHET	L	0440
46.	GO TO 35	L	0450
47.	45 THET=THET+.02*DTHET	L	0460
48.	GO TO 35	L	0470
49.	50 K=K+1	L	0480
50.	55 R=A*SQRT(2.0*SIN(2.0*THET))	L	0490
51.	XON(K+1)=XIN(2)-R*COS(THET)	L	0500
52.	YON(K+1)=YIN(2)+R*SIN(THET)	L	0510
53.	SON(K+1)=SON(K)+SQRT((XON(K+1)-XON(K))**2+(YON(K+1)-YON(K))**2)	L	0520
54.	IF (ABS(SON(K+1)-SON(K)).GT.1.05*DS) GO TO 60	L	0530
55.	IF (ABS(SON(K+1)-SON(K)).LT..95*DS) GO TO 65	L	0540
56.	GO TO 70	L	0550

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57. 60 THET=THET-.02*DTHT L 0560
58. GO TO 55 L 0570
59. 65 THET=THET+.02*DTHT L 0580
60. GO TO 55 L 0590
61. 70 DYDXO(K+1)=-TAN(3.0*THET) L 0600
62. ALPHA(K+1)=-3.0*THET L 0610
63. CAPPA(K+1)=3.0*SQRT(SIN(2.0*THET)/2.0)/A L 0620
64. DS=DELS/SQRT(1.0+ABS(CAPPA(K+1))) L 0630
65. IF (ABS(DS-DSSAVE).GT..25*DSSAVE) DS=DSSAVE+SIGN(.25*DSSAVE,DS-DSSL L 0640
66. 1AVE) L 0650
67. DSSAVE=DS L 0660
68. DTHT=DS*SQRT(SIN(2.0*THET)/2.0)/A L 0670
69. THET=THET+DTHT L 0680
70. IF (THET.LE.THETMX) GO TO 50 L 0690
71. IF (KOUNT.GT.50) GO TO 95 L 0700
72. DSTEST=((XON(K+1)-XIN(3))**2+(YON(K+1)-YIN(3))**2)**.5 L 0710
73. IF (DSTEST.GT.DS) GO TO 90 L 0720
74. IF (DSTEST.LT..50*(1+DS)) GO TO 75 L 0730
75. IF (DSTEST-.5*DS) GO,85,80 L 0740
76. 75 YON(K+1)=YIN(3) L 0750
77. XON(K+1)=XIN(3) L 0760
78. GO TO 95 L 0770
79. 80 DELS=DELS-DSTEST/FLOAT(K+1-KSTART) L 0780
80. GO TO 25 L 0790
81. 85 DELS=DELS+DSTEST/FLOAT(K+1-KSTART) L 0800
82. GO TO 25 L 0810
83. 90 DELS=.8*DELS L 0820
84. GO TO 25 L 0830
85. 95 DELS1=DS*.2 L 0840
86. IF (DELS1.GT.DELS) DELS1=DELS L 0850
87. WRITE (6,115)KOUNT,THETMX,A L 0860
88. WRITE (6,120)DELSIN,DELS,DELS1,DSTEST L 0870
89. KEND=K+1 L 0880
90. KSTART=KSTART+1 L 0890
91. IF (YIN(2).EQ.YIN(1)) GO TO 105 L 0900
92. DO 100 KROT=KSTART,KEND L 0910
93. XN=XON(KROT) L 0920
94. XON(KROT)=XN*COS(AROT)+YON(KROT)*SIN(AROT) L 0930
95. YON(KROT)=YON(KROT)*COS(AROT)-XN*SIN(AROT) L 0940
96. ALPHA(KROT)=ALPHA(KROT)-AROT L 0950
97. DYDXO(KROT)=TAN(ALPHA(KROT)) L 0960
98. 100 CONTINUE L 0970
99. 105 DO 110 KAL=KSTART,KEND L 0980
100. 110 ALPHA(KAL)=ALPHA(KAL)/PI*180 L 0990
101. RETURN L 1000
102.C L 1010
103.C L 1020
104. 115 FORMAT (3X,I3,2X,I3HITERATIONS---,3X,I3HTHETMXCALC = ,F10.5,3X,PHAL L 1030
105. 1CALC = ,F10.5) L 1040
106. 120 FORMAT (3X,I0HDELS IN = ,F8.5,3X,7HDELS = ,F8.5,3X,11HDELS OUT = ,L 1050
107. 1FA.5,3X,9HDSTEST = ,F8.5) L 1060
108. END L 1070

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SO.LIMITS

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1.      FUNCTION LIMIT (I,J,K)
2.C.... INTEGER FUNCTION LIMITS J BETWEEN I AND K.
3.      LIMIT=I
4.      IF (J.LE.LIMIT) RETURN
5.      LIMIT=K
6.      IF (J.GY.LIMIT) RETURN
7.      LIMIT=J
8.      RETURN
9.      END
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07 OCT 76 14

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X 0000
X 0010
X 0020
X 0030
X 0040
X 0050
X 0060
X 0070
X 0080
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SO.SMIR		05 MAY 77 13	
1.	SUBROUTINE MIRROR (K,YCL)	M	0000
2.C		M	0010
3.C	THIS SUBROUTINE MIRRORS THE HUB TO OBTAIN THE POINTS ON SHROUD	M	0020
4.C	USED FOR 22Y - 2-D INLETS	M	0030
5.C		M	0040
6.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	M	0050
7.	11,ALPHA(500),CAPPA(500),SON(500),PIU180	M	0060
8.	COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS	M	0070
9.	DO 10 J=1,NBDY1	M	0080
10.	K=K+1	M	0090
11.	ISTAR=1+2*NBDY1-K	M	0100
12.	XON(K)=XON(ISTAR)	M	0110
13.	YON(K)=2.0*YCL-YON(ISTAR)	M	0120
14.	CAPPA(K)=-CAPPA(ISTAR)	M	0130
15.	DYDXO(K)=-DYDXO(ISTAR)	M	0140
16.	ALPHA(K)=-ALPHA(ISTAR)	M	0150
17.	SON(K)=SON(ISTAR)	M	0160
18.	10 CONTINUE	M	0170
19.	WRITE (6,15)YCL	M	0180
20.	RETURN	M	0190
21.C		M	0200
22.	15 FORMAT (34H2HUB MIRRORED INTO Y CENTERLINE = ,F8.3)	M	0210
23.	END	M	0220

SO.ISPLOX		07 OCT 76	14
1.	SUBROUTINE PLOXIS (XX, YY, EXEP, ORD, OFSETA, OFSET, SLETRS, SNOSZ, K5, K6, KZ3	0000	
2.	1, L, NK, NL)	23	0010
3.	C	23	0020
4.	CXX	23	0030
5.	CXXXXXXXXX SUBROUTINE ADDED TO DRAW AND LABEL AXIS FRAMES FOR ALL PLOTS	23	0040
6.	COMMON/TITL/ TITL(19,6)	23	0050
7.	UP = 11.-YY-2, *SNOSZ	23	0060
8.	M1=XX	23	0070
9.	M2=YY	23	0080
10.	CALL PLOT(4., -11., -3)	23	0090
11.	CALL PLOT(0., UP, -3)	23	0100
12.	DO 25 I=1, M1	23	0110
13.	X=I	23	0120
14.	P=EXEP*X +OFSETA	23	0130
15.	CALL PLOT(X, C., 2)	23	0140
16.	CALL PLOT(X, .2, 2)	23	0150
17.	M=I/2	23	0160
18.	B=FLOAT(I)-FLOAT(M)-X/2.	23	0170
19.	IF (B) 10, 10, 25	23	0180
20.	10 IF (K5) 15, 15, 20	23	0190
21.	15 CALL NUMBER(X-SNOSZ, -SNOSZ-.10, SNOSZ, P, 0., NK)	23	0200
22.	GO TO 25	23	0210
23.	20 SN = 1.333*SNOSZ	23	0220
24.	CALL NUMBER(X-SNOSZ-SNOSZ, -SN-SNOSZ-.10, SN, 10., 0., -1)	23	0230
25.	CALL NUMBER(999.0, -SNOSZ -.10, SNOSZ, P, 0., NK)	23	0240
26.	25 CALL PLOT(X, 0., 3)	23	0250
27.	B = (XX-54.*SLETRS)/2.	23	0260
28.	CALL SYMBOL(B, -SNOSZ-SLETRS-.15-.6, SLETRS, TITL(1, K), C., 54)	23	0270
29.	CALL PLOT(0., 0., 3)	23	0280
30.	DO 45 J=1, M2	23	0290
31.	Y=J	23	0300
32.	O=ORD*Y+OFSET	23	0310
33.	CALL PLOT(0., Y, 2)	23	0320
34.	CALL PLOT(.2, Y, 2)	23	0330
35.	N=J/2	23	0340
36.	B=FLOAT(J)-FLOAT(N)-Y/2.	23	0350
37.	IF (B) 30, 30, 45	23	0360
38.	30 IF (K6) 35, 35, 40	23	0370
39.	35 CALL NUMBER(-4.*SNOSZ -.15, Y, SNOSZ, 0, 0., NL)	23	0380
40.	GO TO 45	23	0390
41.	40 SN = 1.333*SNOSZ	23	0400
42.	CALL NUMBER(-.15 -SN-SN-SN, Y-SNOSZ, SN, 10., 0., -1)	23	0410
43.	CALL NUMBER(999.0, Y+SN-SNOSZ, SNOSZ, 0, 0., NL)	23	0420
44.	45 CALL PLOT(0., Y, 3)	23	0430
45.	C = (YY-54.*SLETRS)/2.	23	0440
46.	CALL SYMBOL(-SNOSZ-SNOSZ-SNOSZ-.15-.6, C, SLETRS, TITL(1, L), 90., 54)	23	0450
47.	CALL PLOT(0., YY, 3)	23	0460
48.	CALL PLOT(XX, YY, 2)	23	0470
49.	CALL PLOT(XX, 0., 2)	23	0480
50.	DO 50 J=1, M2, 2	23	0490
51.	Y=J	23	0500
52.	IF (Y.EQ.YY) GO TO 55	23	0510
53.	CALL PLOT(XX, Y, 3)	23	0520
54.	CALL PLOT(0., Y, 2)	23	0530
55.	IF ((Y+1.).EQ.YY) GO TO 55	23	0540
56.	CALL PLOT(0., Y+1., 3)	23	0550

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57.	50	CALL PLOT(XX,Y+1.,2)	23	0560
58.	55	CONTINUE	23	0570
59.		DO 60 J=1,M1,2	23	0580
60.		X=J	23	0590
61.		IF (X.EQ.XX) GO TO 65	23	0600
62.		CALL PLOT(XX-X,YY,3)	23	0610
63.		CALL PLOT(XX-X,0.,2)	23	0620
64.		IF ((XX-X-1.).EQ.0.) GO TO 65	23	0630
65.		CALL PLOT(XX-X-1.,0.,3)	23	0640
66.	60	CALL PLOT(XX-X-1.,YY,2)	23	0650
67.	65	RETURN	23	0660
68.		END	23	0670

50.PRLPS		07 OCT 76	13
1.	SUBROUTINE PRELPS (KODE,KAT,IA,K1,K2)	F	0000
2.	COMMON /MAIN/ XIN(10),YIN(10),DELSMX,P102,DELS1,IHUB	F	0010
3.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	F	0020
4.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	F	0030
5.	COMMON /SPREP/ KPREP	F	0040
6.	KPREP=1	F	0050
7.	IL=IA	F	0060
8.	IF (KAT.EQ.1) GO TO 60	F	0070
9.	KID=KODE	F	0080
10.	XI=XIN(1)	F	0090
11.	YI=YIN(1)	F	0100
12.	IF (IA.EQ.5) GO TO 10	F	0110
13.	XC=XIN(4)	F	0120
14.	YC=YIN(4)	F	0130
15.	GO TO 15	F	0140
16.	10 XC=XIN(5)	F	0150
17.	YC=YIN(5)	F	0160
18.	IL=IA+1	F	0170
19.	15 DO 45 IB=1,IL	F	0180
20.	IF (IR.NE.6) GO TO 20	F	0190
21.	IF (ABS(XIN(6))+ABS(YIN(6)),LE.1.E-15.OR,YIN(6).EQ.200.) GO TO 45	F	0200
22.	IF (YIN(6).NE.-100.) GO TO 20	F	0210
23.	XIN(6)=-XIN(6)	F	0220
24.	GO TO 45	F	0230
25.	20 GO TO (25,30,35,40,30,40),KODE	F	0240
26.	25 YIN(IP)=YIN(IA)-(YIN(IB)-YIN(IA))	F	0250
27.	GO TO 45	F	0260
28.	30 XIN(IP)=XIN(1)-(XIN(IB)-XIN(1))	F	0270
29.	GO TO 45	F	0280
30.	35 YIN(IR)=YIN(1)-(YIN(IP)-YIN(1))	F	0290
31.	GO TO 45	F	0300
32.	40 XIN(IP)=XIN(IA)-(XIN(IB)-XIN(IA))	F	0310
33.	45 CONTINUE	F	0320
34.	IF (KODE.EQ.5) GO TO 50	F	0330
35.	IF (KODE.EQ.6) GO TO 55	F	0340
36.	RETURN	F	0350
37.	50 KODE=1	F	0360
38.	GO TO 15	F	0370
39.	55 KODE=3	F	0380
40.	GO TO 15	F	0390
41.	60 DO 90 IB=K1,K2	F	0400
42.	GO TO (65,70,75,80,65,75),KID	F	0410
43.	65 YON(IB)=YC-(YON(IB)-YC)	F	0420
44.	GO TO 85	F	0430
45.	70 XON(IB)=XI-(XON(IB)-XI)	F	0440
46.	GO TO 85	F	0450
47.	75 YON(IB)=YI-(YON(IB)-YI)	F	0460
48.	GO TO 85	F	0470
49.	80 XON(IB)=XC-(XON(IB)-XC)	F	0480
50.	85 DYDXO(IB)=-DYDXO(IB)	F	0490
51.	90 CONTINUE	F	0500
52.	IF (KID.EQ.5) GO TO 95	F	0510
53.	IF (KID.EQ.6) GO TO 100	F	0520
54.	RETURN	F	0530
55.	95 KID=2	F	0540
56.	GO TO 60	F	0550

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57.	100 NID=4	F	0560
58.	GO TO 60	F	0570
59.	END	F	0580

50,SGENS		07 OCT 76	14
1.	INTEGER FUNCTION SGEN (S,F,NS)	0	0000
2.C.....	GENERATES THE PARAMETER ARRAY S FOR THE SET OF POINT-PAIRS F SUCH	0	0010
3.C.....	THAT S(I) GIVES THE LINE INTEGRAL ON THE CURVE OF FZTRP (S,F,X,NS)	0	0020
4.C.....	WHEN X=S(I).	0	0030
5.	REAL S(NS)	0	0040
6.	COMPLEX F(NS),DZTRP	0	0050
7.	DATA MAX,N,FN,TEST/4,10,10,0,0.01/	0	0060
8.	DO 10 I=2,NS	0	0070
9.	10 S(I)=S(I-1)+CABS(F(I)-F(I-1))	0	0080
10.	DO 30 K=1,MAX	0	0090
11.	SGEN=0	0	0100
12.	DO 25 I=2,NS	0	0110
13.	DS=S(I)-S(I-1)	0	0120
14.	DARG=DS/FN	0	0130
15.	ARGD=S(I-1)-DARG/2.	0	0140
16.	SUM=0.0	0	0150
17.	DO 15 J=1,N	0	0160
18.	ARG=ARGD*FLOAT(J)*DARG	0	0170
19.	15 SUM=SUM+(CABS(DZTRP(S,F,ARG,NS))-1.0)	0	0180
20.	SUM=SUM/FN	0	0190
21.	ERROR=ABS(SUM)	0	0200
22.	DS=DS*SUM	0	0210
23.	DO 20 J=1,NS	0	0220
24.	20 S(J)=S(J)+DS	0	0230
25.	IF (ERROR.GT.TEST.AND.SGEN.EQ.0) SGEN=I	0	0240
26.	25 CONTINUE	0	0250
27.	IF (SGEN.EQ.0) RETURN	0	0260
28.	30 CONTINUE	0	0270
29.C.....	SGEN=INDEX IF IT DOESN'T CONVERGE.	0	0280
30.	RETURN	0	0290
31.	END	0	0300

50.SIMQUE		07 OCT 76	13
1.C		K	0000
2.C		K	0010
3.C	SUBROUTINE SIMQ	K	0020
4.C		K	0030
5.C	PURPOSE	K	0040
6.C	OBTAIN SOLUTION OF A SET OF SIMULTANEOUS LINEAR EQUATIONS,	K	0050
7.C	AX=B	K	0060
8.C	USAGE	K	0070
9.C	CALL SIMQ(A,B,N,KS)	K	0080
10.C		K	0090
11.C	DESCRIPTION OF PARAMETERS	K	0100
12.C	A - MATRIX OF COEFFICIENTS STORED COLUMNWISE. THESE ARE	K	0110
13.C	DESTROYED IN THE COMPUTATION. THE SIZE OF MATRIX A IS	K	0120
14.C	N BY N.	K	0130
15.C	B - VECTOR OF ORIGINAL CONSTANTS (LENGTH N). THESE ARE	K	0140
16.C	REPLACED BY FINAL SOLUTION VALUES, VECTOR X.	K	0150
17.C	N - NUMBER OF EQUATIONS AND VARIABLES. N MUST BE .GT. ONE.	K	0160
18.C	KS - OUTPUT DIGIT	K	0170
19.C	0 FOR A NORMAL SOLUTION	K	0180
20.C	1 FOR A SINGULAR SET OF EQUATIONS	K	0190
21.C		K	0200
22.C	REMARKS	K	0210
23.C	MATRIX A MUST BE GENERAL.	K	0220
24.C	IF MATRIX IS SINGULAR, SOLUTION VALUES ARE MEANINGLESS.	K	0230
25.C	AN ALTERNATIVE SOLUTION MAY BE OBTAINED BY USING MATRIX	K	0240
26.C	INVERSION (MINV) AND MATRIX PRODUCT (GMPD).	K	0250
27.C		K	0260
28.C	SUBROUTINES AND FUNCTION SUBPROGRAMS REQUIRED	K	0270
29.C	NONE	K	0280
30.C		K	0290
31.C	METHOD	K	0300
32.C	METHOD OF SOLUTION IS BY ELIMINATION USING LARGEST PIVOTAL	K	0310
33.C	DIAGONAL. EACH STAGE OF ELIMINATION CONSISTS OF INTERCHANGING	K	0320
34.C	ROWS WHEN NECESSARY TO AVOID DIVISION BY ZERO OR SMALL	K	0330
35.C	ELEMENTS.	K	0340
36.C	THE FORWARD SOLUTION TO OBTAIN VARIABLE N IS DONE IN	K	0350
37.C	N STAGES. THE BACK SOLUTION FOR THE OTHER VARIABLES IS	K	0360
38.C	CALCULATED BY SUCCESSIVE SUBSTITUTIONS. FINAL SOLUTION	K	0370
39.C	VALUES ARE DEVELOPED IN VECTOR B, WITH VARIABLE 1 IN B(1),	K	0380
40.C	VARIABLE 2 IN B(2),....., VARIABLE N IN B(N).	K	0390
41.C	IF NO PIVOT CAN BE FOUND EXCEEDING A TOLERANCE OF 0.0,	K	0400
42.C	THE MATRIX IS CONSIDERED SINGULAR AND KS IS SET TO 1. THIS	K	0410
43.C	TOLERANCE CAN BE MODIFIED BY REPLACING THE FIRST STATEMENT.	K	0420
44.C		K	0430
45.C		K	0440
46.C		K	0450
47.	SUBROUTINE SIMQ (A,B,N,KS)	K	0460
48.	DIMENSION A(1), B(1)	K	0470
49.C		K	0480
50.C	FORWARD SOLUTION	K	0490
51.C		K	0500
52.	TOL=0.0	K	0510
53.	KS=0	K	0520
54.	JJ=-N	K	0530
55.	DO 45 J=1,N	K	0540
56.	JY=J+1	K	0550

57.	JJ=JJ+N+1	K	0560
58.	BIGA=0	K	0570
59.	II=JJ-J	K	0580
60.	DO 15 I=J,N	K	0590
61.C		K	0600
62.C	SEARCH FOR MAXIMUM COEFFICIENT IN COLUMN	K	0610
63.C		K	0620
64.	IJ=II+I	K	0630
65.	IF (ABS(BIGA)-ABS(A(I,I))) 10,15,15	K	0640
66.	10 BIGA=A(I,I)	K	0650
67.	IMAX=I	K	0660
68.	15 CONTINUE	K	0670
69.C		K	0680
70.C	TEST FOR PIVOT LESS THAN TOLERANCE (SINGULAR MATRIX)	K	0690
71.C		K	0700
72.	IF (ABS(BIGA)-TOL) 20,20,25	K	0710
73.	20 K5=1	K	0720
74.	RETURN	K	0730
75.C		K	0740
76.C	INTERCHANGE ROWS IF NECESSARY	K	0750
77.C		K	0760
78.	25 II=J+N+(J-2)	K	0770
79.	IT=IMAX-J	K	0780
80.	DO 30 K=J,N	K	0790
81.	II=II+N	K	0800
82.	I2=II+IT	K	0810
83.	SAVE=A(I1)	K	0820
84.	A(I1)=A(I2)	K	0830
85.	A(I2)=SAVE	K	0840
86.C		K	0850
87.C	DIVIDE EQUATION BY LEADING COEFFICIENT	K	0860
88.C		K	0870
89.	30 A(I1)=A(I1)/BIGA	K	0880
90.	SAVE=B(IMAX)	K	0890
91.	B(IMAX)=B(I)	K	0900
92.	B(I)=SAVE/BIGA	K	0910
93.C		K	0920
94.C	ELIMINATE NEXT VARIABLE	K	0930
95.C		K	0940
96.	IF (J-N) 35,50,35	K	0950
97.	35 IOS=N*(J-1)	K	0960
98.	DO 45 IX=JY,N	K	0970
99.	IXJ=IOS+IX	K	0980
100.	IT=J-IX	K	0990
101.	DO 40 JX=JY,N	K	1000
102.	IXJX=N+(JX-1)+IX	K	1010
103.	JJX=IXJX+IT	K	1020
104.	40 A(IXJX)=A(IXJX)-[A(IXJ)*A(JJX)]	K	1030
105.	45 B(IX)=B(IX)-[B(J)*A(IXJ)]	K	1040
106.C		K	1050
107.C	BACK SOLUTION	K	1060
108.C		K	1070
109.	50 NY=N-1	K	1080
110.	IT=N*N	K	1090
111.	DO 55 J=1,NY	K	1100
112.	IA=IT-J	K	1110
113.	IB=N-J	K	1120

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114.	IC=N	K	1130
115.	DO 55 K=1,J	K	1140
116.	B(1B)=B(1B)-A(1A)*B(1C)	K	1150
117.	IA=IA-N	K	1160
118.	55 IC=IC-1	K	1170
119.	RETURN	K	1180
120.	END	K	1190

50.SINTPO		07 OCT 76	14
1.	SUBROUTINE SINTP (Z,W,N,X1,Y1)	24	0000
2.	C((((ENLARGED FROM THE ORIGINAL (200)	24	0010
3.	DIMENSION A(13)	24	0020
4.	DIMENSION X(250), Y(250), Z(250), W(250)	24	0030
5.	DATA CODFF/6HENDOFF/	24	0040
6.	DO 10 I=1,N	24	0050
7.	X(I)=Z(I)	24	0060
8.	10 Y(I)=W(I)	24	0070
9.	CALL SORTXY (X,Y,N)	24	0080
10.	C	24	0090
11.	DO 15 I=1,N	24	0100
12.	K=I	24	0110
13.	IF (X1.GT.X(I)) GO TO 15	24	0120
14.	IF (X1.EQ.X(I)) GO TO 20	24	0130
15.	IF (X1.LT.X(I)) GO TO 25	24	0140
16.	15 CONTINUE	24	0150
17.	20 Y1=Y(K)	24	0160
18.	GO TO 30	24	0170
19.	25 IF (K.EQ.1) GO TO 35	24	0180
20.	IF (K.EQ.N) K=N-1	24	0190
21.	W1=(X1-X(K))*X1-X(K+1)/(X(K-1)-X(K))/(X(K-1)-X(K+1))	24	0200
22.	W2=(X1-X(K-1))*X1-X(K+1)/(X(K)-X(K-1))/(X(K)-X(K+1))	24	0210
23.	W3=(X1-X(K-1))*X1-X(K)/(X(K+1)-X(K-1))/(X(K+1)-X(K))	24	0220
24.	Y1=Y(K-1)*W1+Y(K)*W2+Y(K+1)*W3	24	0230
25.	30 RETURN	24	0240
26.	35 Y1=0.0	24	0250
27.	RETURN	24	0260
28.	ENTRY ECHO	24	0270
29.	CALL ERTRAN(6,'BASG,T 25. .')	24	0280
30.	WRITE (6,40)	24	0290
31.	40 FORMAT(1H1,23X,' INPUT FILE DUMP'/)	24	0300
32.	45 READ (5,50,END=60)A	24	0310
33.	50 FORMAT(13A6)	24	0320
34.	WRITE (6,55)A	24	0330
35.	WRITE (25,50)A	24	0340
36.	55 FORMAT(1H ,13A6)	24	0350
37.	GO TO 45	24	0360
38.	60 WRITE (25,50)EODFF	24	0370
39.	REWIND 25	24	0380
40.	RETURN	24	0390
41.	END	24	0400

50.SCAL		07 OCT 76	14
1.	SUBROUTINE SORTXY(X,Y,NPTS)	25	0000
2.	DIMENSION X(100),Y(100)	25	0010
3.	10 N=NPTS	25	0020
4.	15 NN=N-1	25	0030
5.	20 DO 55 KT=1,NN	25	0040
6.	XMIN=X(KT)	25	0050
7.	JAD=KT	25	0060
8.	JKL=KT+1	25	0070
9.	25 DO 45 JK=JKL,N	25	0080
10.	30 IF (XMIN-X(JK)) 45,45,35	25	0090
11.	35 XMIN=X(JK)	25	0100
12.	40 JAD=JK	25	0110
13.	45 CONTINUE	25	0120
14.	50 YMIN=Y(JAD)	25	0130
15.	X(JAD)=X(KT)	25	0140
16.	Y(JAD)=Y(KT)	25	0150
17.	X(KT)=XMIN	25	0160
18.	Y(KT)=YMIN	25	0170
19.	55 CONTINUE	25	0180
20.	RETURN	25	0190
21.	END	25	0200

50.SPGENS		07 OCT 76 14	
1.	LOGICAL FUNCTION SPGEN (S,Z,C,NS,SP,NSP,SFIN,NMAX)	Q	0000
2.C.....	GENERATES TABLE SP HAVING VALUES OF PARAMETER S AS WIDELY SPACED	Q	0010
3.C	AS POSSIBLE AND YET SATISFYING THE FOLLOWING CONDITIONS ON DS	Q	0020
4.C	1 NSP .LE. NMAX	Q	0030
5.C	2 DS .LE. A/C(S) (C=CURVATURE)	Q	0040
6.C	3 DS .LE. DSHAX	Q	0050
7.C	4A DS(I) .LE. DS(I-1)*RMAX	Q	0060
8.C	4B DS(I) .GE. DS(I-1)/RMAX	Q	0070
9.C	FOR THIN SECTIONS, AN ADDITIONAL CONDITION IS	Q	0080
10.C	DS .LE. B*TLOC (TLOC=LOCAL THICKNESS)	Q	0090
11.C.....	SPGEN = .TRUE. IF ALL CONDITIONS HAVE BEEN SATISFIED.	Q	0100
12.		Q	0110
13.	REAL S(NS),C(NS),SP(NMAX)	Q	0120
14.	COMPLEX Z(NS),FZTRP	Q	0130
15.	LOGICAL THIN,FIN	Q	0140
16.	COMMON /SPGENC/ A,DSHAX,RMAX,THIN,B,TMIN,DSEND	Q	0150
17.	COMMON /MAIN/ XIN(10),YIN(10),DELSHX,PI02,DELSI,INHUB	Q	0160
18.	DATA ONE,CHIN/1.0001,1.0E-6/	Q	0170
19.		Q	0180
20.C.....	INITIALIZATION SECTION.	Q	0190
21.	SPGEN=.FALSE.	Q	0200
22.	J1=MAX(0,NSP,2)+1	Q	0210
23.	IF (NSP.GT.1) GO TO 15	Q	0220
24.	IF (NSP.LT.1) SP(1)=S(1)	Q	0230
25.	DS1= DELS1	Q	0240
26.	10 SP(2)=SP(1)+DS1	Q	0250
27.		Q	0260
28.C.....	BEGIN MAIN LOOP.	Q	0270
29.	15 DO 45 J=J1,NMAX	Q	0280
30.	L=J	Q	0290
31.	20 I=L	Q	0300
32.	25 DSLAST=SP(I-1)-SP(I-2)	Q	0310
33.	SBAR=SP(I-1)+DSLAST/2.0	Q	0320
34.	CA=AMAX1(CHIN,ABS(FZTRP(S,C,SBAR,NS)))	Q	0330
35.	OSLIM=AMIN1(DS1,DSLAST*RMAX)	Q	0340
36.	IF (.NOT.THIN) GO TO 30	Q	0350
37.	TLOC=CABS(FZTRP(S,Z,SBAR,NS)-FZTRP(S,Z,S(NS)-SBAR,NS))	Q	0360
38.	OSLIM=AMIN1(OSLIM,B*AMAX1(TLOC,TMIN))	Q	0370
39.	30 DSFIN=SFIN-SP(I-1)	Q	0380
40.	NEVEN=DSFIN/OSLIM/ONE+1.0	Q	0390
41.	DSEVEN=DSFIN/FLOAT(NEVEN)	Q	0400
42.	DS=AMIN1(CA/DSEVEN)	Q	0410
43.	IF (1.NE.J) DS=AMIN1(DS,DSLAST/RMAX)	Q	0420
44.		Q	0430
45.C.....	CALCULATED VALUE OF DS SATISFIES CONDITIONS 2 THRU 4A.TEST FOR 4B.	Q	0440
46.	IF (DS.GE.DSLAST/RMAX) GO TO 40	Q	0450
47.		Q	0460
48.C.....	IF CONDITION 4B IS NOT SATISFIED, RE-DO EARLIER INTERVALS	Q	0470
49.C.....	USING SMALLER VALUES OF DS. IF RE-DOING ALL INTERVALS WON'T	Q	0480
50.C.....	WORK, START OVER USING SMALLER STARTING VALUE OF DS (DS1).	Q	0490
51.	35 L=L-1	Q	0500
52.	IF (L.GE.J1) GO TO 20	Q	0510
53.	IF (NSP.GT.1) RETURN	Q	0520
54.	DS1=DS1/RMAX	Q	0530
55.	GO TO 10	Q	0540
56.		Q	0550

57.C.....	IF CONDITIONS 2 THRU 4B ARE SATISFIED, TEST FOR FINISH.	Q	0560
58.	40 SP(I)=SP(I-1)*DS	Q	0570
59.	FIN=SFIN/SP(I).LE.ONE	Q	0580
60.	IF (FIN.AND.DS.GT.DSEND) GO TO 35	Q	0590
61.	IF (FIN) GO TO 50	Q	0600
62.	IF (I.GE.J) GO TO 45	Q	0610
63.	I=I+1	Q	0620
64.	GO TO 25	Q	0630
65.	45 CONTINUE	Q	0640
66.C.....	SPGEN =.FALSE. IF CONDITION 1 CANNOT BE SATISFIED.	Q	0650
67.	RETURN	Q	0660
68.		Q	0670
69.C.....	IF CONDITIONS ARE SATISFIED, UPDATE NSP.	Q	0680
70.	50 NSP=1	Q	0690
71.	DELS1=DS	Q	0700
72.	SPGEN=.TRUE.	Q	0710
73.	RETURN	Q	0720
74.	END	Q	0730

50.STRY		07 OCT 76	13
1.	SUBROUTINE STRAIT (K,RSHR)	B	0000
2.C		B	0010
3.C	A REGULAR STRAIGHT SEGMENT	B	0020
4.C		B	0030
5.	COMMON /MAIN/ XIN(10),YIN(10),DELSMX,PI02,DELS1,IMUB	B	0040
6.	COMMON /FOR355/IO,DELS,XDK(20),YBK(20),XON(500),YON(500),DYDXO(500)	B	0050
7.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	B	0060
8.	COMMON /55/ NBDY1,NBDY2,TYPBDY,NBDYS	B	0070
9.	COMMON /FNST/ NFIRST	B	0080
10.	COMMON /NHIGH/ NSPHG,NLAST,XLAST(500)	B	0090
11.	NFIRST=M	B	0100
12.	XTEST=XIN(2)-XIN(1)	B	0110
13.	YTEST=YIN(2)-YIN(1)	B	0120
14.	IF (XTEST.EQ.0.0) GO TO 13	B	0130
15.	DYDXC=YTEST/XTEST	B	0140
16.	ALPHAC=ATAN(YTEST/XTEST)	B	0150
17.	GO TO 15	B	0160
18.	10 DYDXC=99999.	B	0170
19.	ALPHAC=PI02	B	0180
20.C		B	0190
21.C	CALCULATE DELSNW	B	0200
22.C		B	0210
23.	15 STOT=SQRT(XTEST**2+YTEST**2)	B	0220
24.	ANDS=STOT/DELS1	B	0230
25.	AINDS=AIN(ANDS)	B	0240
26.	TTEST=ANDS-AINDS	B	0250
27.	IF (TTEST.GE..5) AINDS=AINDS+1.0	B	0260
28.	DELSNW=STOT/AINDS	B	0270
29.	DELSNW=ABS(DELSNW)	B	0280
30.	DELS1=DELSNW	B	0290
31.	DELS=DELS1	B	0300
32.	IF (YTEST) 20,35,20	B	0310
33.	20 IF (XTEST.EQ.0.0) GO TO 50	B	0320
34.	DYDXO(K+1)=DYDXC	B	0330
35.	ALPHA(K+1)=ALPHAC	B	0340
36.	SIGN=1.0	B	0350
37.	IF (XTEST.LT.0.0) SIGN=-1.0	B	0360
38.	YON(K+1)=YON(K)+SIGN*DELSNW*SIN(ALPHA(K+1))	B	0370
39.	IF (NSPHG.EQ.0) GO TO 25	B	0380
40.	XON(K+1)=XON(NLAST-1)	B	0390
41.	NLAST=NLAST-1	B	0400
42.	GO TO 30	B	0410
43.	25 XON(K+1)=XON(K)+SIGN*DELSNW*COS(ALPHA(K+1))	B	0420
44.	30 SON(K+1)=SON(K)+SQRT((XON(K+1)-XON(K))**2+(YON(K+1)-YON(K))**2)	B	0430
45.	CAPPA(K+1)=0.0	B	0440
46.	IF (XTEST.LT.0.0.AND.XON(K+1).LE.XIN(2).OR.XTEST.GT.0.0.AND.XON(K+1).GE.XIN(2)) GO TO 55	B	0450
47.	11).GE.XIN(2)) GO TO 55	B	0460
48.	IF (ABS(XON(K+1)-XIN(2)).LE.1.0E-4*DELS.AND.ABS(YON(K+1)-YIN(2)).LE.1.0E-4*DELS) GO TO 60	B	0470
49.	1E-1.0E-4*DELS) GO TO 60	B	0480
50.	K=K+1	B	0490
51.	GO TO 20	B	0500
52.	35 DYDXO(K+1)=0.0	B	0510
53.	ALPHA(K+1)=0.0	B	0520
54.	SIGN=1.0	B	0530
55.	IF (XTEST.LT.0.0) SIGN=-1.0	B	0540
56.	IF (NSPHG.EQ.0) GO TO 40	B	0550

57.	XON(K+1)=XON(NLAST-1)	B	0560
58.	NLAST=NLAST-1	B	0570
59.	GO TO 45	B	0580
60.	40 XON(K+1)=XON(K)+SIGN*DELSNW	B	0590
61.	45 YON(K+1)=YON(K)	B	0600
62.	SON(K+1)=SON(K)+SORT((XON(K+1)-XON(K))*2+(YON(K+1)-YON(K))*2)	B	0610
63.	CAPPA(K+1)=0.0	B	0620
64.	IF (XTEST.LT.0.0.AND.XON(K+1).LE.XIN(2).OR.XTEST.GT.0.0.AND.XON(K+1).GE.XIN(2)) GO TO 55	B	0630
65.	IF (ABS(XON(K+1)-XIN(2)).LE.1.0E-4*DELS.AND.ABS(YON(K+1)-YIN(2)).LB	B	0640
66.	1E-1.0E-4*DELS) GO TO 60	B	0650
67.	K=K+1	B	0660
68.	GO TO 35	B	0670
69.	50 DYDX0(K+1)=99999.	B	0680
70.	ALPHA(K+1)=PI02	B	0690
71.	SIGN=1.0	B	0700
72.	IF (YTEST.LT.0.0) SIGN=-1.0	B	0710
73.	XON(K+1)=XON(K)	B	0720
74.	YON(K+1)=YON(K)+SIGN*DELSNW	B	0730
75.	SON(K+1)=SON(K)+SORT((XON(K+1)-XON(K))*2+(YON(K+1)-YON(K))*2)	B	0740
76.	CAPPA(K+1)=0.0	B	0750
77.	IF (YTEST.LT.0.0.AND.YON(K+1).LE.YIN(2).OR.YTEST.GT.0.0.AND.YON(K+1).GE.YIN(2)) GO TO 55	B	0760
78.	IF (ABS(YON(K+1)-YIN(2)).LE.1.0E-4*DELS.AND.ABS(XON(K+1)-XIN(2)).LB	B	0770
79.	1E-1.0E-4*DELS) GO TO 60	B	0780
80.	K=K+1	B	0790
81.	GO TO 50	B	0800
82.	55 IF (ABS(XON(K+1)-XIN(2)).LE.1.0E-3*DELS.AND.ABS(YON(K+1)-YIN(2)).LB	B	0810
83.	1E-1.0E-3*DELS) GO TO 60	B	0820
84.	K=K-1	B	0830
85.	K=K+1	B	0840
86.	DO 65 KAL=KFIRST,K	B	0850
87.	65 ALPHA(KAL)=ALPHA(KAL)/PT0180	B	0860
88.	RETURN	B	0870
89.	END	B	0880
90.		B	0890
91.		B	0900

50.SPRCRC		07 OCT 76	13
1.	SUBROUTINE SUPERC (XBRK,YBRK,ENREED,DELS1,ISTART)	H	0000
2.	DIMENSION ENREED(2)	H	0010
3.	DIMENSION XBRK(6), YBRK(6), XBRK1(13), YBRK1(13)	H	0020
4.	REAL LOGXOA, LOGYOB	H	0030
5.	COMMON /SUPP/ IFLD	H	0040
6.	COMMON /FOR355/IO,DELS,XBRK(25),YBRK(20),XON(500),YON(500),DYDXO(500)	H	0050
7.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	H	0060
8.	COMMON /SUPN/ XOA(2),YOB(2),LOGXOA(2),LOGYOB(2)	H	0070
9.	COMMON /NHIGH/ NSPHG,NLAST,XLAST(500),YLAST(500)	H	0080
10.	COMMON /SENSE/ X8(2),Y8(2),A,B,INFLEC	H	0090
11.	COMMON /SPREP/ KPREP	H	0100
12.	COMMON /PAC/ PACE,DELSHL	H	0110
13.	COMMON /TRYFIT/ KOUNT	H	0120
14.	PI=0	H	0130
15.	PI=3.14159265	H	0140
16.	IF (IFLD.EQ.1) DELSHL=DELS1	H	0150
17.	DELSIN=DELS1	H	0160
18.	DELS2=DELS1	H	0170
19.	KOUNT=0	H	0180
20.	10 I=ISTART	H	0190
21.	IF (IFLD.GE.1) DS=DELS2	H	0200
22.	KOUNT=KOUNT+1	H	0210
23.	I=ISTART	H	0220
24.	X4Y=XBRK(4)	H	0230
25.	Y4Y=YBRK(4)	H	0240
26.	***** FOR SUBSEQUENT ITERATIONS, SKIP LL INITIALIZATION.	H	0250
27.	IF (ILL.GE.5.OR.LL.LT.-5).AND.KOUNT.NE.1) GO TO 50	H	0260
28.	LL=0	H	0270
29.	***** FLAG FOR ENDP. CURVATURE MATCH IS YBRK(6)=200.	H	0280
30.	IF (YBRK(6)=200.) 40,15,40	H	0290
31.	15 CAP=-ABS(XBRK(6))	H	0300
32.	LL=-8	H	0310
33.	IF (XBRK(6).NE.999.) GO TO 50	H	0320
34.	IF (XBRK(3).NE.XBRK(2)) GO TO 20	H	0330
35.	***** IF THE PT. WHERE CURVATURES MUST MATCH HAS INFIN. SLOPE,	H	0340
36.	***** OBTAIN CURVATURE FROM PREVIOUS SEGMENT'S EXPONENTS.	H	0350
37.	IF (XBRK(2).NE.XBRK(1)) GO TO 25	H	0360
38.	LL=-8	H	0370
39.	CAP=-2.*A/X8(1)/B/B	H	0380
40.	GO TO 50	H	0390
41.	20 IF (XBRK(5).NE.XBRK(4)) GO TO 25	H	0400
42.	LL=-8	H	0410
43.	CAP=-2.*A/X8(1)/B/B	H	0420
44.	GO TO 50	H	0430
45.	25 IF (XBRK(6).EQ.999.) XBRK(6)= CAPPA(ISTART)	H	0440
46.	IF (XBRK(6).EQ.0..OR.ABS(XBRK(6)).GE.99999.) GO TO 30	H	0450
47.	CAP=-ABS(XBRK(6))	H	0460
48.	GO TO 50	H	0470
49.	30 WRITE (6,35)	H	0480
50.	35 FORMAT(1H,3X,99HREQUEST FOR SPECIFIC CURVATURE MUST BE MODIFIED OR	H	0490
51.	1R WITHDRAWN. DESIRED CURVATURE CAN'T=0. OR INFINTY)	H	0500
52.	STOP	H	0510
53.	***** POINT-PLUS-SLOPE FLAG IS YBRK(6)= -100.	H	0520
54.	40 IF (YBRK(6)+100.) 50,45,50	H	0530
55.	45 LL= 5	H	0540
56.	***** ADDITIONAL FLAG FOR INFLECTION-POINT-PLUS-SLOPE IS YBRK(3)= 100H	H	0550

57.	IF(YBRK(3).EQ.100.) LL=6	H	0560
58.	C(11111)FOR INITIAL GUESS OF UNKNOWN Y AT INFLECTION POINT,USE ENDPY. AVG.	H	0570
59.	IF(LL.EQ.6) YBRK(3)= YBRK(2)+(XBRK(2)-XBRK(3))/(XBRK(2)-XBRK(4))*(H	H	0580
60.	1YBRK(4)-YBRK(2))	H	0590
61.	C(11111) CREATE A DUMMY POINT TO SIMULATE THE GIVEN SLOPE THROUGH	H	0600
62.	C (XBRK(3),YBRK(3))	H	0610
63.	YBRK(6)= XBRK(6)+(XBRK(3)+5.1-XBRK(3)) *YBRK(3)	H	0620
64.	XBRK(6)= XBRK(3)+5.	H	0630
65.	50 DO 55 J=1,6	H	0640
66.	XBK1(J+7)=XBRK(J)	H	0650
67.	YBK1(J+7)=YBRK(J)	H	0660
68.	55 CONTINUE	H	0670
69.	IF (XBK1(7).NE.XBK1(8)) GO TO 65	H	0680
70.	IF (YBK1(8).LT.YBK1(9)) GO TO 60	H	0690
71.	SLOP=99999.	H	0700
72.	SINATD=1.0	H	0710
73.	SLOPE=99999.	H	0720
74.	ATDYDD=90.	H	0730
75.	COSATD=0.0	H	0740
76.	GO TO 80	H	0750
77.	60 SLOP=-99999.	H	0760
78.	SINATD=-1.0	H	0770
79.	SLOPE=-99999.	H	0780
80.	ATDYDD=-90.	H	0790
81.	COSATD=0.0	H	0800
82.	GO TO 80	H	0810
83.	65 SLOP=(YBK1(9)-YBK1(8))/(XBK1(9)-XBK1(8))	H	0820
84.	SLOPE=ATAN(SLOP)	H	0830
85.	ATDYDD=SLOPE/P10180	H	0840
86.	IF (XBK1(8)-XBK1(9)) 70,75,75	H	0850
87.	70 SLOPE=PI+SLOPE	H	0860
88.	ATDYDD=-ATDYDD	H	0870
89.	1PI=1	H	0880
90.	75 SINATD=SIN(SLOPE)	H	0890
91.	COSATD=COS(SLOPE)	H	0900
92.	80 CONTINUE	H	0910
93.	INFLEC = ABS(INT(SINATD))	H	0920
94.	XBK(8)=XBK1(8)	H	0930
95.	YBK(8)=YBK1(8)	H	0940
96.	DO 85 J=9,13	H	0950
97.	XP=XBK1(J)-XBK1(8)	H	0960
98.	YP=YBK1(J)-YBK1(8)	H	0970
99.	XBK(J)=XBK1(8)+XP*COSATD+YP*SINATD	H	0980
100.	YBK(J)=YBK1(8)-XP*SINATD+YP*COSATD	H	0990
101.	85 CONTINUE	H	1000
102.	Q=1.	H	1010
103.	P=1.	H	1020
104.	XBK(5)=XBK(8)	H	1030
105.		H	1040
106.	YBK(5)=YBK(8)	H	1050
107.	XBK(6)=XBK(9)	H	1060
108.	YBK(6)=YBK(9)	H	1070
109.	XBK(9)=XBK(10)	H	1080
110.	YBK(9)=YBK(10)	H	1090
111.	DELS=DELS1	H	1100
112.	DSSAVE=DELS	H	1110
113.	XTH=XBK1(9)	H	1120

114.	YTM=YBK(9)	H	1130
115.		H	1140
116.	B=YBK(11)-YBK(6)	H	1150
117.	TOMEGA=(XBK(12)-XIM(11))/(YBK(12)-YBK(11))	H	1160
118.	IF (ABS(TOMEGA).LE..0001) TOMEGA=0.	H	1170
119.	OMEGA=ATAN(TOMEGA)	H	1180
120.	XQ=XBK(6)+B*TOMEGA	H	1190
121.	YQ=YBK(11)	H	1200
122.	A=XQ-XBK(11)	H	1210
123.	XI9=XQ-XBK(9)	H	1220
124.	ETA9=YQ-YBK(9)	H	1230
125.	YB(1)=ETA9	H	1240
126.	XB(1)=XI9-ETA9*TOMEGA	H	1250
127.	XB(2)=XQ-XBK(13)-TOMEGA*(YQ-YBK(13))	H	1260
128.	YB(2)=YQ-YBK(13)	H	1270
129.	BOA=B/A	H	1280
130.	IF (LL.GE.5) GO TO 90	H	1290
131.	IF (LL.LE.-6) GO TO 1C5	H	1300
132.	LL=0	H	1310
133.	IF (ENREED(1).GT.0.) P=ENREED(1)	H	1320
134.	IF (ENREED(2).GT.0.) Q=ENREED(2)	H	1330
135.	IF (P.EQ.1.) LL=1	H	1340
136.	IF (0.EQ.1.) LL=LL+2	H	1350
137.	IF (LL.EQ.0) GO TO 115	H	1360
138.	90 XOA(1)=XB(1)/A	H	1370
139.	YOB(1)=YB(1)/B	H	1380
140.	LOGXOA(1)=ALOG(XOA(1))	H	1390
141.	LOGYOB(1)=ALOG(YOB(1))	H	1400
142.	IF (XBRK(6).EQ.0..AND.LL.EQ.3) GO TO 95	H	1410
143.	IF (LL.NE.3) GO TO 100	H	1420
144.	XOA(2)=XB(2)/A	H	1430
145.	YOB(2)=YB(2)/B	H	1440
146.	LOGXOA(2)=ALOG(XOA(2))	H	1450
147.	LOGYOB(2)=ALOG(YOB(2))	H	1460
148.	GO TO 100	H	1470
149.	95 LL=4	H	1480
150.	100 CALL FONISDTP,Q,LL	H	1490
151.	GO TO 115	H	1500
152.	CITIT(1) FOR CURVATURE MATCH, NO ITERATION REQD. BUT ONE EXPONENT MUST=2H	H	1510
153.	105 IF (XBRK(3).EQ.XBRK(2)) P=2.	H	1520
154.	IF (XBRK(3).EQ.XBRK(4)) Q=2.	H	1530
155.	CITIT(1) OBTAIN OTHER EXPONENT FROM ENDPOINT CURVATURE RELATION	H	1540
156.	110 IF (P.EQ.2.) Q=-2.*B/CAP/A/A	H	1550
157.	IF (Q.EQ.2. .AND. P.NE.2.) P=-2.*A/CAP/B/B	H	1560
158.	115 IF (KOUNT.NE.1) GO TO 120	H	1570
159.	WRITE (6,475) P,A,XQ,Q,B,YQ,OMEGA	H	1580
160.	120 I=1	H	1590
161.	IL0=I	H	1600
162.	XON(I)=XON(I+1)	H	1610
163.	CION=1./P	H	1620
164.	BT=B*TOMEGA	H	1630
165.	DX1=DELS*COSATD	H	1640
166.	XP=XIM-XBK(8)	H	1650
167.	YP=YIM-YBK(8)	H	1660
168.	XIROT=XBK(18)+XP*COSATD+YP*SINATD	H	1670
169.	XI=XQ-XIROT	H	1680
170.	YI=YQ-YBK(6)	H	1690

171.		X=XI-Y*OMEGA	H	1700
172.		IF (X.LI.C.D) X=D.D	H	1710
173.		DSH=SON(I)-SON(I-1)	H	1720
174.	125	XOATON=(X/A)**P	H	1730
175.		YOBTON=(Y/B)**Q	H	1740
176.		C((((I AVOID (L.E. D.))**(.LF. D.)	H	1750
177.		IF (P.GE.1.) GO TO 135	H	1760
178.		IF (X.NF.D.) GO TO 130	H	1770
179.		XNMOAN=99999.	H	1780
180.		GO TO 140	H	1790
181.	130	XNMOAN=(1./X)**(1.-P)/A**P	H	1800
182.		GO TO 140	H	1810
183.	135	XNMOAN=X**P*(P-1.) / A**P	H	1820
184.	140	IF (Q.GE.1.) GO TO 150	H	1830
185.		IF (Y.NF.D.) GO TO 145	H	1840
186.		YNMOBN=99999.	H	1850
187.		GO TO 155	H	1860
188.	145	YNMOBN=(1./Y)**(1.-Q)/B**Q	H	1870
189.		GO TO 155	H	1880
190.	150	YNMOBN=Y**Q*(Q-1.) / B**Q	H	1890
191.	155	FOPY=XOATON+YOBTON-1.	H	1900
192.		IF (ABS(FOPY).LE.1.DD-5) GO TO 160	H	1910
193.		FPOFY=Q*YNMOBN-OMEGA*P*XNMOAN	H	1920
194.		YNEW=Y-FOPY/FPOFY	H	1930
195.		GO TO 165	H	1940
196.	160	YNEW=Y	H	1950
197.	165	IF (ABS(Y-YNEW)/YNEW-.1F-4) 175,175,170	H	1960
198.	170	Y=YNEW	H	1970
199.		X=XI-Y*OMEGA	H	1980
200.		GO TO 125	H	1990
201.	175	Y=YNEW	H	2000
202.		X=XI-Y*OMEGA	H	2010
203.	180	ETA=Y	H	2020
204.		DELS=DELS?	H	2030
205.		IPN=1	H	2040
206.		IF (X.LI.C.D) X=D.D	H	2050
207.		C((((I AVOID (L.E. D.))**(.LF. D.)	H	2060
208.		IF (P.GE.1.) GO TO 190	H	2070
209.		IF (X.NF.D.) GO TO 185	H	2080
210.		XOANM1=99999.	H	2090
211.		GO TO 195	H	2100
212.	185	XOANM1=(A/X)**(1.-P)	H	2110
213.		GO TO 195	H	2120
214.	190	XOANM1=(X/A)**(P-1.)	H	2130
215.	195	IF (Q.GE.1.) GO TO 235	H	2140
216.		IF (Y.NF.D.) GO TO 200	H	2150
217.		YOBNM1=99999.	H	2160
218.		GO TO 210	H	2170
219.	200	YOBNM1=(B/Y)**(1.-Q)	H	2180
220.		GO TO 210	H	2190
221.	205	YOBNM1=(Y/B)**(Q-1.)	H	2200
222.	210	F1=(XOANM1/A)*P	H	2210
223.		F2=(YOBNM1/B)*Q	H	2220
224.		F3=OMEGA*F1	H	2230
225.		IF (X.EQ.D.D) GO TO 225	H	2240
226.		IF (P.GE.2.) GO TO 215	H	2250
227.		F10X=P*(1./X)**(2.-P)/A**P	H	2260

228.	GO TO 220	H	2270
229.	215 F10X=P*X** (P-2.) / A**P	H	2280
230.	220 GO TO 230	H	2290
231.	225 IF (P.EQ.2.) F10X=2.0 / (A*A)	H	2300
232.	IF (P.GT.2.) F10X=0.0	H	2310
233.	230 IF (Y.EQ.0.0) GO TO 240	H	2320
234.	IF (0.6E-2.) GO TO 235	H	2330
235.	F20Y=0*(1./Y)**(2.-Q) / B**Q	H	2340
236.	GO TO 245	H	2350
237.	235 F20Y=0*Y** (Q-2.) / B**Q	H	2360
238.	GO TO 245	H	2370
239.	240 IF (Q.EQ.2.) F20Y=2. / (B*B)	H	2380
240.	IF (Q.GT.2.) F20Y=0.	H	2390
241.	245 DEN=F2-F3	H	2400
242.	IF (DEN.NE.0.0) GO TO 250	H	2410
243.	DETDXI=99999.	H	2420
244.	GO TO 255	H	2430
245.	250 DETDXI=-F1/DEN	H	2440
246.	255 DYDXO(IPN)=DETDXI	H	2450
247.	CIMEPT=1.-DETDXI*YOMEGA	H	2460
248.	IF (IPN.EQ.1) START.AND.LL.LE.-6) GO TO 260	H	2470
249.	C(1111) ELIMINATE CASES OF UNDEFINED CURVATURE	H	2480
250.	IF (X.EQ.0..AND.P.LT.2.) GO TO 265	H	2490
251.	IF (Y.EQ.0..AND.Q.LT.2.) GO TO 265	H	2500
252.	G1=(P-1.)*F10X*CIMEPT	H	2510
253.	SAND1=DEN*G1	H	2520
254.	SAND2=F1*(1Q -1.)*F20Y*DETDXI-G1*YOMEGA)	H	2530
255.	IF (ABS(DETDXI).GT.1.E 11) DETDXI=1.E 11	H	2540
256.	BKT=(1.+DETDXI**2)**1.5	H	2550
257.	CAPPA(IPN)=(SAND2-SAND1)/DEN**2/BKT	H	2560
258.	IF (P.EQ.2..AND.X.EQ.0.) CAPPA(IPN)=-2.*B/Q/A/A	H	2570
259.	IF (Q.EQ.2..AND.ABS(Y).LT.1.E-4) CAPPA(IPN)=-2.*A/P/B/B	H	2580
260.	GO TO 270	H	2590
261.	260 IF (P.EQ.2.) CAPPA(IPN)=-2.*B/Q/A/A	H	2600
262.	IF (Q.EQ.2.) CAPPA(IPN)=-2.*A/P/B/B	H	2610
263.	GO TO 270	H	2620
264.	265 CAPPA(IPN)=99999.	H	2630
265.	270 ALPHA(IPN)=ATAN(DYDXO(IPN))/PI*180	H	2640
266.	XON(IPN)=XG-XI	H	2650
267.	YON(IPN)=YG-ET	H	2660
268.	DYI=DELS*SIGNAID	H	2670
269.	IF (IFLD.GE.1) GO TO 275	H	2680
270.	DS=DELS/(1.0+.20*TANH(ABS(CAPPA(1))))	H	2690
271.	GO TO 285	H	2700
272.	275 IF (IFLD.GT.1.AND.(IPN-1)START).GT.3) GO TO 280	H	2710
273.	DS=DS-PAVE*DS	H	2720
274.	GO TO 290	H	2730
275.	280 DS=DS+1.5*PAVE*DS	H	2740
276.	IF (DS.GT.DELSHL) DS=DELSHL	H	2750
277.	GO TO 290	H	2760
278.	285 IF (ARSTDS=DELS).GT..20*DELS) DS=DELS*SIGN(.23*DELS,DS-DELS)	H	2770
279.	290 IF (DS.LT..02*DELS2) DS=.02*DELS2	H	2780
280.	IF (IFLD.GT.0.AND.(1-1)START).GT.200) GO TO 413	H	2790
281.	IF (NSPHL.EQ.0) GO TO 295	H	2800
282.	DXI=ABS(XLAST(INLAST)-XLAST(INLAST-1))	H	2810
283.	DXI=DXI	H	2820
284.	DYI=ARSTYLAST(INLAST)-YLAST(INLAST-1)	H	2830

285.	NLAST=NLAST-1	H	2840
286.	295 IF (ABS(DETXI)-1.) 320,320,300	H	2850
287.	300 DY1=DS/SQRT(1.+1./DETDXI**2)	H	2860
288.	IF (NSPHG.NE.0) DY1=DX1	H	2870
289.	305 YTM=YOM(I)+DY1	H	2880
290.	IF (YTM-YBK(1)) 310,390,390	H	2890
291.	310 ETA=YD-YTM	H	2900
292.	Y=ETA	H	2910
293.C		H	2920
294.C	STRAIGHT SECTION BETWEEN POINTS 11 AND 12 MUST HAVE SLOPE ABOVE 1	H	2930
295.C		H	2940
296.C		H	2950
297.C	X MAY NOT BE TESTED AGAINST XBK(1)	H	2960
298.C		H	2970
299.	X=A*(1.-(Y/B)**Q)**C10N	H	2980
300.	XI=X+Y*OMEGA	H	2990
301.	XTM=XI-XI	H	3000
302.	DX1=XTM-XON(I)	H	3010
303.	DELTAS=SQRT(DY1**2+DX1**2)	H	3020
304.	IF (DELTAS.GT.1.02*DS.AND.IPN.NE.1.AND.NSPHG.EQ.0) GO TO 315	H	3030
305.	GO TO 390	H	3040
306.	315 DY1=DS*DY1/DELTAS	H	3050
307.	GO TO 305	H	3060
308.	320 DX1=DS/SQRT(1.+DETDXI**2)	H	3070
309.	IF (NSPHG.NE.0) DX1=DY1	H	3080
310.	IF (NSPHG.NE.0.AND.IP1.EQ.1) DX1=DX11	H	3090
311.	325 XTM=XON(I)+SIGN(DX1,DETDXI)	H	3100
312.	IF (DETDX1.EQ.0.) XTM=XON(I)-DX1	H	3110
313.	XI=XO-XTM	H	3120
314.	Y=YD-YON(I)	H	3130
315.	330 X=XI-Y*OMEGA	H	3140
316.	IF (X.LT.0.0) X=0.0	H	3150
317.	XOATON=(X/A)**P	H	3160
318.	YOBTON=(Y/B)**Q	H	3170
319.C	IF ((1.-(X/A)**P).LE.0.1) GO TO 340	H	3180
320.	IF (P.GE.1.) GO TO 340	H	3190
321.	IF (X.NE.0.) GO TO 335	H	3200
322.	XNMOAN=99999.	H	3210
323.	GO TO 345	H	3220
324.	335 XNMOAN=(1./X)**(1.-P)/A**P	H	3230
325.	GO TO 345	H	3240
326.	340 XNMOAN=X**((P-1.)/A**P	H	3250
327.	345 IF (Q.GE.1.) GO TO 355	H	3260
328.	IF (Y.NE.0.) GO TO 350	H	3270
329.	YNMOBN=99999.	H	3280
330.	GO TO 360	H	3290
331.	350 YNMOBN=(1./Y)**(1.-Q)/B**Q	H	3300
332.	GO TO 360	H	3310
333.	355 YNMOBN=Y**((Q-1.)/B**Q	H	3320
334.	360 FOFY=XOATON+YOBTON-1.	H	3330
335.	IF (ABS(FOFY).LE.1.3E-5) GO TO 365	H	3340
336.	FPOFY=Q*YNMOBN-OMEGA*P*XNMOAN	H	3350
337.	YNEW=Y-FOFY/FPOFY	H	3360
338.	GO TO 370	H	3370
339.	365 YNEW=Y	H	3380
340.	370 IF (ABS(Y-YNEW)/YNEW-.1E-4) 380,380,375	H	3390
341.	375 Y=YNEW	H	3400

342.	GO TO 330	H	3410
343.	380 Y=YNEW	H	3420
344.	X=XI-Y*OMEGA	H	3430
345.	YTM=Y0-Y	H	3440
346.	XI=X+Y*OMEGA	H	3450
347.C	OYI=YTM-YON(I-1)	H	3460
348.	OYI=YTM-YON(I)	H	3470
349.	DELTAS=SQRT(OYI**2+OXI**2)	H	3480
350.	IF (DELTAS.GT.1.02*DS.AND.IPN.NE.1.AND.NSPHG.EQ.0) GO TO 385	H	3490
351.	GO TO 390	H	3500
352.	385 OXI=OS*OXI/DELTAS	H	3510
353.	GO TO 325	H	3520
354.	390 SON(I)=SON(I-1)*DSH	H	3530
355.	DSH=DS	H	3540
356.	IF (NSPHG.NE.0) DS=OXI	H	3550
357.	IF (ABS(YTM-YBK(11)).LT..001*DS) GO TO 400	H	3560
358.	I=I+1	H	3570
359.	IF (YTM-YBK(11)) 180,395,395	H	3580
360.	395 IHI=I-1	H	3590
361.	GO TO 405	H	3600
362.	400 IHI=I	H	3610
363.	I=I+1	H	3620
364.	405 XTM=XBK(11)	H	3630
365.	IHI=IHI	H	3640
366.	410 IF (IFLD.LE.0.OR.(I-I*START).LT.200) GO TO 415	H	3650
367.	IF (IFLD.EQ.1) PACE=PACE-.25*PACE	H	3660
368.	IF (IFLD.EQ.2) PACE=PACE+.25*PACE	H	3670
369.	I=ILO-1	H	3680
370.	GO TO 19	H	3690
371.	415 DO 455 J=JLO,IHI	H	3700
372.	XP=XON(IJ)-XBK(I8)	H	3710
373.	YP=YON(IJ)-YBK(I8)	H	3720
374.	XONTJ=XBK(I8)+XP*CSATO-YP*SINATO	H	3730
375.	YONTJ=YBK(I8)+XP*SINATO+YP*CSATO	H	3740
376.	DEL22=DELS2	H	3750
377.	IF (J.NE.IHI) GO TO 445	H	3760
378.	DSTEST=((XONTJ-IHI)*XNTJ**2+(YONTJ-IHI)*YNTJ**2)**.5	H	3770
379.	IF (KOUNT.GT.150) GO TO 445	H	3780
380.	IF (ABS(OS-DSTEST).LT..1*DS) GO TO 420	H	3790
381.	IF (DSTEST.LT..01*DS) GO TO 425	H	3800
382.	IF (IHI.EQ.ILO) GO TO 440	H	3810
383.	IF (ABS(DELS2-DSTEST).LT..001*DS) GO TO 435	H	3820
384.	IF (DSTEST.LT..5*DS) GO TO 435	H	3830
385.	IF (DSTEST.GT..5*DS) GO TO 430	H	3840
386.C	VIA BUTTON 175/74	H	3850
387.	420 IHI=IHI+1	H	3860
388.	I=I+1	H	3870
389.	IONE=IHI-1	H	3880
390.	SON(IHI)=SON(IONE)*DSTEST	H	3890
391.	425 IHI=IHI+1	H	3900
392.	IONE=IHI-1	H	3910
393.	XON(IONE)=X4I	H	3920
394.	YON(IONE)=Y4I	H	3930
395.	GO TO 445	H	3940
396.	430 IF (IFLD.GT.1) GO TO 435	H	3950
397.	DELS2=(FLOAT(IHI-ILO)*DELS2+DSTEST)/FLOAT(IHI+1-ILO)	H	3960
398.	IF (KOUNT.GE.10) DELS2=(DELS2+DEL22)/2.0	H	3970

399.	I=ILO-1	H	3980
400.	GO TO 10	H	3990
401.	435 DELS2=DELS2+DSTEST/FLOAT(IHI-ILO)	H	4000
402.	IF (KOUNT.GE.10) DELS2=(DELS2+DEL22)/2.	H	4010
403.	IF (IFLO.GT.1.AND.(DS/DEL22).GT.2.)	H	4020
404.	1PACE=PACE*(1.+DSTEST/DEL22/(FLOAT(IHI-ILO)*(1.+1.5*PACE)+*FLOAT(IHI	H	4030
405.	2I-ILO-1)-(1.+1.5*PACE)+*FLOAT(IHI-ILO-1.)/1.5/PACE))	H	4040
406.	IF (IFLO.GT.1.AND.(DS/DEL22).GT.2.) DELS2=DEL22	H	4050
407.	I=ILO-1	H	4060
408.	GO TO 10	H	4070
409.	440 DELS2=.8*DELS2	H	4080
410.	I=ILO-1	H	4090
411.	GO TO 10	H	4100
412.	445 ALPHA(J)=ALPHA(J)-ATD YD	H	4110
413.	IF (ABS(ABS(ALPHA(J))-95.).LE.1.E-4) GO TO 453	H	4120
414.	DYDXO(J)=TAN(ALPHA(J)*PI0180)	H	4130
415.	GO TO 455	H	4140
416.	450 DYDXO(J)=SIGN(999.,ALPHA(J))	H	4150
417.	455 CONTINUE	H	4160
418.	IHI=IONE	H	4170
419.	IF (KOUNT.GT.150) WRITE (6,480)(XBRK(IUB),YBRK(IUB),IUB=1,5)	H	4180
420.	DELS1=DS	H	4190
421.	IF (IFLO.EQ.0) DELS1=1.1*DS	H	4200
422.	IF (DELS1.GT.DELS2.AND.(IFLO.LE.1)) DELS1=DELS2	H	4210
423.	DO 465 J=ILO,IHI	H	4220
424.	IF (J.EQ.1) GO TO 463	H	4230
425.	SON(J)=SON(J-1)+SQRT((XON(J)-XON(J-1))*2+(YON(J)-YON(J-1))*2)	H	4240
426.	GO TO 465	H	4250
427.	460 SON(J)=0.0	H	4260
428.	465 CONTINUE	H	4270
429.	WRITE (6,485)KOUNT	H	4280
430.	WRITE (6,490)DELS1N,DELS2,DELS1,DSTEST	H	4290
431.	IF (IFLO.GT.0) WRITE (6,470)PACE	H	4300
432.	470 FORMAT(1H+,87X,'FINAL PACE= ',F8.5)	H	4310
433.	ID=1	H	4320
434.	X8(1)=P	H	4330
435.	X8(2)=Q	H	4340
436.	XDIF=XBRK(4)-XBRK(5)	H	4350
437.	IF (ABS(XDIF).LT.1.E-15) XDIF=SIGN(1.E-15,XDIF)	H	4360
438.	DYDXO(ID-1)=(YBRK(4)-YBRK(5))/XDIF	H	4370
439.	IF (ABS(DYDXO(ID-1)).GT.99999.) DYDXO(ID-1)=SIGN(99999.,DYDXO(ID-1))	H	4380
440.	ALPHA(ID-1)=ATAN(DYDXO(ID-1))/PT0180	H	4390
441.	IF (CAPPA(ID-1).EQ.0..AND.P.EQ.2..AND.O.EQ.2.) CAPPA(ID-1)=-2.*A/PI	H	4400
442.	1/B	H	4410
443.	RETURN	H	4420
444.C		H	4430
445.C		H	4440
446.	475 FORMAT(1X/4X,4HP = ,E16.8,4X,4HA = ,E16.8,7X,5HXD = ,E16.8/4X,4HQ	H	4450
447.	1= ,E16.8,4X,4HB = ,E16.8,7X,5HYD = ,E16.8,3X,8HOMEGA = ,F16.8/1X)	H	4460
448.	480 FORMAT (1H0,6CHTHIS SET OF DATA EXCEEDED 150ITERATIONS. CALCULATION	H	4470
449.	IS STOPPED/5X,4HXBPK,5X,4HYBRK/5X,1P10E13.3)	H	4480
450.	485 FORMAT (1X,5X,13,2X,13HITERATIONS---	H	4490
451.	490 FORMAT (6X,10HDELS IN = ,F8.5,3X,7HDELS = ,F8.5,3X,11HDELS CUT = ,	H	4500
452.	1F8.5,3X,9HDSTEST = ,F8.5)	H	4510
453.	END	H	4520

50. TESTY		07 OCT 76	13
1.	SUBROUTINE TEST (YA)	E	0000
2.	COMMON /HAIN/ XIN(10),YIN(10),DELSMX,PI02,DELS1,INHUB	E	0010
3.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),OYDX0(500)	E	0020
4.	1),ALPHA(500),CAPPA(500),SON(500),PI0180	E	0030
5.	COMMON /SPREP/ KPREP	E	0040
6.	M=YA-1	E	0050
7.	IF (XIN(2).EQ.XIN(1)) GO TO 10	E	0060
8.	SLP1=(YIN(2)-YIN(1))/(XIN(2)-XIN(1))	E	0070
9.	GO TO 15	E	0080
10.	10 TEST1=(YIN(2)-YIN(1))/(XIN(M)-XIN(1))	E	0090
11.	SLP1=SIGN(99999.,TEST1)	E	0100
12.	15 IF ((XIN(1).LT.XIN(M).AND.XIN(1).LE.XIN(2)).OR.(XIN(1).GE.XIN(2).AL	E	0110
13.	IND.XIN(1).GT.XIN(M))) GO TO 20	E	0120
14.	TYP=XIN(1)-XIN(2)	E	0130
15.	XIN(1)=XIN(1)+SIGN(50.,TYP)	E	0140
16.		E	0150
17.	1(XIN(1)-XIN(2))/(XIN(2)-XIN(1)+SIGN(50.,TYP))+YIN(2)	E	0160
18.	20 SLP2=(YIN(M)-YIN(1))/(XIN(M)-XIN(1))	E	0170
19.C		E	0180
20.C	ROTATION ONLY	E	0190
21.C		E	0200
22.	25 IF (SLP1.GT.SLP2) RETURN	E	0210
23.C		E	0220
24.C	MIRROR INTO XIN(1)	E	0230
25.C		E	0240
26.	30 CALL PRELPS (2,0,1A,1,1)	E	0250
27.	RETURN	E	0260
28.	END	E	0270

SO. TLUS		07 OCT 76 14	
1.	SUBROUTINE TLU (TABLE,ARG,N,I)	W	0000
2.C.....	TABLE LOOK UP FINDS I SUCH THAT	W	0010
3.C	ARG.GE.TABLE(I).AND.ARG.LY.TABLE(I+1)	W	0020
4.C	IF I=D, ARG.LY.TABLE(I)	W	0030
5.C	IF I=N, ARG.GE.TABLE(N)	W	0040
6.	REAL TABLE(N)	W	0050
7.	I=LIMIT(1,I,N)	W	0060
8.	IF (ARG.GE.TABLE(I)) GO TO 15	W	0070
9.C.....	DESCEND IN TABLE.	W	0080
10.	10 I=I-1	W	0090
11.	IF (I.LE.0) RETURN	W	0100
12.	IF (ARG.GE.TABLE(I)) RETURN	W	0110
13.	GO TO 10	W	0120
14.C.....	ASCEND IN TABLE.	W	0130
15.	15 IF (I.GE.N) RETURN	W	0140
16.	IF (ARG.LY.TABLE(I+1)) RETURN	W	0150
17.	I=I+1	W	0160
18.	GO TO 15	W	0170
19.	END	W	0180

50.WPNCH		07 OCT 76	14
1.	SUBROUTINE WPUNCH	Y	0000
2.	COMMON /FOREOD/ YGEOMF,YSIGF,ICURVN,NONEWF,IVORT	Y	0010
3.	COMMON /SS/ NBDY1,NBDY2,TYPBDY,NBDYS	Y	0020
4.	COMMON /FOR3SS/IO,DELS,XBK(20),YBK(20),XON(500),YON(500),DYDXO(500)	Y	0030
5.	11,ALPHA(500),CAPPA(500),SON(500),PI0180	Y	0040
6.	COMMON /HWYTE/ YFLAG,NDY4,PROG,YITLE(9),BODIES(4),IDENT,YLO(25),YHY	Y	0050
7.	11(25),NDY(25),XRAK(25),NBDPTS(5),NO6,NRAKES	Y	0060
8.	COMMON/ LOY/XMIN,YMIN,ORD,EXEP,XX,YY,LPNCHO,IPLOTA,MM	Y	0070
9.	DIMENSION YOFF(200), XOFF(200), FI(500)	Y	0080
10.	DIMENSION XI(25),YI(25)	Y	0090
11.	COMMON /MNSD/ NNSD,NSDBDY(10)	Y	0100
12.	DATA BODYD/6H=BODY /,IFLAG1/4H 1111,IFLAG2/4H 1 1/,Y22Y/6H 22Y/,	Y	0110
13.	11FLG2A/1H /,1FLG2B/1H1/	Y	0120
14.C		Y	0130
15.C	IF YLO AND YHI ARE READ IN AS ZERO,CALCULATE THEM FOR THAT RAKE	Y	0140
16.C	(FOR HUB AND SHROUD CASES ONLY) 1/4/73	Y	0150
17.C		Y	0160
18.C	FIND HIGHLIGHT ON THE SHROUD	Y	0170
19.C		Y	0180
20.	NB=NBDPTS(1)+1	Y	0190
21.	IF (IFLAG.EQ.1)NB=1	Y	0200
22.	NE=NBDPTS(2)	Y	0210
23.C	1 SET JMIN=LAST SHROUD PT., IN CASE X NEVER INCREASES ON SHROUD(VTOL)	Y	0220
24.	JMIN=NE	Y	0230
25.	DO 10 I=NB,NE	Y	0240
26.	IF (XON(I+1).LT.XON(I)) GO TO 10	Y	0250
27.	JMIN=I	Y	0260
28.	GO TO 15	Y	0270
29.	10 CONTINUE	Y	0280
30.	15 GO TO 20 I=I,NE	Y	0290
31.	20 FI(I)=1	Y	0300
32.	NOFF=0	Y	0310
33.	IF (NRAKES.EQ.0) GO TO 70	Y	0320
34.	DO 65 I=1,NRAKES	Y	0330
35.	NLO=NOFF+1	Y	0340
36.	NOFF=NLO+NDY(I)	Y	0350
37.	ENDY=NDY(I)	Y	0360
38.	IF (YHI(I).GE.0.0.OR.YLO(I).EQ.0.0) GO TO 25	Y	0370
39.	GO TO 35	Y	0380
40.	25 IF (YHI(I).NE.0.0) GO TO 30	Y	0390
41.	CALL SINTP (XON(NB),YON(NB),JMIN-NB+1,XRAK(I),YH)	Y	0400
42.	CALL SINTP (XON(NB),FI(NB),JMIN-NB+1,XRAK(I),FI)	Y	0410
43.	IF=FI	Y	0420
44.	DS=SQRT((XON(IF)-XON(IF+1))**2+(YON(IF)-YON(IF+1))**2)	Y	0430
45.	YHI(I)=YH-DS	Y	0440
46.	30 IF (YLO(I).NE.0.0.OR.XRAK(I).LT.XON(I)) GO TO 35	Y	0450
47.	CALL SINTP (XON,YON,NBDPTS(1),XRAK(I),YL)	Y	0460
48.	CALL SINTP (XON,FI,NBDPTS(1),XRAK(I),FI)	Y	0470
49.	IF=FI	Y	0480
50.	DS=SQRT((XON(IF)-XON(IF+1))**2+(YON(IF)-YON(IF+1))**2)	Y	0490
51.	YLO(I)=YL+DS	Y	0500
52.	35 DYI=(YHI(I)-YLO(I))/ENDY	Y	0510
53.	K=0	Y	0520
54.	DO 55 J=NLO,NOFF	Y	0530
55.	DJM=J-NLO	Y	0540
56.	XOFF(J)=XRAK(I)	Y	0550

57.	YOFF(J)=YLO(I)*DYI*DJM	Y	0560
58.	IF (XOFF(J)-XMIN) 55,40,40	Y	0570
59.	40 IF (XOFF(J)-XX*EXEP-XMIN) 45,45,55	Y	0580
60.	45 IF (YOFF(J)-YY*ORD-YMIN) 50,50,55	Y	0590
61.	50 K=K+1	Y	0600
62.	X(K)=XOFF(J)	Y	0610
63.	Y(K)=YOFF(J)	Y	0620
64.	55 CONTINUE	Y	0630
65.C		Y	0640
66.C	***** PLOT OFF-BODY POINTS (RAKES)	Y	0650
67.C		Y	0660
68.	60 CALL LINE(X,Y,K,1,-1,0,XMIN,EXEP,YMIN,ORD)	Y	0670
69.	65 CONTINUE	Y	0680
70.	70 NTBDY=NBDYS+NNSD+1-IVORT	Y	0690
71.	NLOOP=2-IVORT	Y	0700
72.	IF (NRDYS.EQ.3) GO TO 75	Y	0710
73.	GO TO 80	Y	0720
74.	75 NTBDY=NTBDY+1	Y	0730
75.	NLOOP=3	Y	0740
76.	80 K=0	Y	0750
77.	DO 110 I=1,NLOOP	Y	0760
78.	M=NTBDY-I+1	Y	0770
79.	IFLAGG=IFLAG2	Y	0780
80.	IF (M.EQ.NTBDY .OR. NBDYS.EQ.3.AND.M.EQ.3) IFLAGG=IFLY	Y	0790
81.	IFLAG	Y	0800
82.	IF (PROG.EQ.Y22Y) GO TO 85	Y	0810
83.C		Y	0820
84.C	***** PUNCH OPTION *****	Y	0830
85.C		Y	0840
86.	IF (LPNCHO.EQ.1) GO TO 90	Y	0850
87.	WRITE (17,115) (TITLE(L),L=1,9),M,BODYD,IDENT	Y	0860
88.	WRITE (17,120)M,IFLAGG,N06,IVORT,IDENT	Y	0870
89.	GO TO 90	Y	0880
90.	85 IFLG22=IFLG2A	Y	0890
91.	IF (LPNCHO.EQ.1) WRITE (17,130)M,IFLG22,(TITLE(L),L=1,7),M,BODYD,1	Y	0900
92.	IDENT	Y	0910
93.	90 CONTINUE	Y	0920
94.	IF (LPNCHO.EQ.1) WRITE (17,125)IDENT	Y	0930
95.	NA=1	Y	0940
96.	NS=0	Y	0950
97.	IF (I.NE.1) K=1	Y	0960
98.	DO 105 J=1,M	Y	0970
99.	IF (J.GT.NBDYS.AND.NNSD.NE.0) GO TO 95	Y	0980
100.	NB=NBDPTS(J)	Y	0990
101.	GO TO 100	Y	1000
102.	95 NS=NS+1	Y	1010
103.	IF (NS.GT.NNSD) NSDBDY(NS)=NBDPTS(NBDYS+1)-NBDPTS(NBDYS)	Y	1020
104.	NB=NSDBDY(NS)+NA-1	Y	1030
105.	100 NP=NB-NA+1	Y	1040
106.	IF (LPNCHO.EQ.1)	Y	1050
107.	1CALL WRTXY (NP,IDENT,J,K,XON,YON,NA,NB,PROG)	Y	1060
108.	NA=NB+1	Y	1070
109.	105 CONTINUE	Y	1080
110.	K=0	Y	1090
111.	NA=1	Y	1100
112.	NR=NOFF	Y	1110
113.	J=0	Y	1120

114.	IF (LPNCHO.EQ.1)	Y	1130
115.	CALL WRTXY (NOFF,IDENT,J,K,XOFF,YOFF,NA,NB,PROG)	Y	1140
116.	IF (PROG.NE.Y22V) GO TO 115	Y	1150
117.	IFLG22=IFLG2B	Y	1160
118.	IF (LPNCHO.EQ.C) GO TO 115	Y	1170
119.	WRITE (17,130)M,IFLG22,(TITLE(L),L=1,7),M,BODYD,IDENT	Y	1180
120.	WRITE (17,135)	Y	1190
121.	110 CONTINUE	Y	1200
122.	RETURN	Y	1210
123.C		Y	1220
124.C	FORMATS	Y	1230
125.C		Y	1240
126.C		Y	1250
127.C		Y	1260
128.	115 FORMAT (9A6,11,A6,2X,A6)	Y	1270
129.	120 FORMAT (11,A4,11,8X,11,47X,A6,11X)	Y	1280
130.	125 FORMAT (52X,A6,11X)	Y	1290
131.	130 FORMAT (11,6H11,A1,4X,7A6,11,A6,1X,A6)	Y	1300
132.	135 FORMAT (3H0.0,7X,3H0.0,7X,3H90.)	Y	1310
133.	END	Y	1320

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SO.WRTXY		08 OCT 76 08	
1.	SUBROUTINE WRTXY (NP,IDENT,J,K,X,Y,NA,NB,PROG)	20	0000
2.C		20	0010
3.C	WRITE X AND Y COORDINATES	20	0020
4.C		20	0030
5.	DIMENSION X(1), Y(1)	20	0040
6.	COMMON /FORCOD/ IGEOMF,ISIGF,ICURVN,NONEWF,IVORT	20	0050
7.	DATA T22Y/6H 22Y/	20	0060
8.	WRITE (17,25) IGEOMF,ISIGF,ICURVN,NONEWF,NP,IDENT	20	0070
9.	IF (PROG.NE.T22Y) GO TO 15	20	0080
10.	IF (J.NE.C) GO TO 13	20	0090
11.	WRITE (17,45) J,K,IDENT	20	0100
12.	GO TO 20	20	0110
13.	10 WRITE (17,40) J,K,IDENT	20	0120
14.	GO TO 20	20	0130
15.	15 WRITE (17,30) J,K,IDENT	20	0140
16.	20 IF (K.EQ.1) RETURN	20	0150
17.	WRITE (17,35) (X(L),L=NA,NB)	20	0160
18.	WRITE (17,35) (Y(L),L=NA,NB)	20	0170
19.	RETURN	20	0180
20.C		20	0190
21.C	FORMAT STATEMENTS	20	0200
22.C		20	0210
23.C		20	0220
24.C		20	0230
25.	25 FORMAT (4I1,3X,13,52X,A6,11X)	20	0240
26.	30 FORMAT (9X,11,9X,11,42X,A6,11X)	20	0250
27.	35 FORMAT(6E13.8)	20	0260
28.	40 FORMAT (9X,11,9X,1H1,9X,11,32X,A6,11X)	20	0270
29.	45 FORMAT (9X,11,19X,11,32X,A6,11X)	20	0280
30.	END	20	0290

50.XYCAL		07 OCT 76	14
1.	SUBROUTINE XYCALC(KSTART,K2,NTN)	N	0000
2.C	-- XYCALC --	N	0010
3.C.....	GENERATES DATA FILES FOR ON-BODY POINTS.	N	0020
4.		N	0030
5.	INTEGER SGEN	N	0040
6.	REAL X(300),Y(300), C(300),S(300),SP(400)	N	0050
7.	COMPLEX Z(300),DZ(300),D2Z,ZZ,FZTRP,DZTRP	N	0060
8.	LOGICAL THIN,EVEN,SPGEN,DONE	N	0070
9.	COMMON/SEGNO/NSEG,J	N	0080
10.	COMMON /MAIN/ XIN(10),YIN(10),DELSMX,PI02,DELS1,INHUB	N	0090
11.	COMMON /SPGEN/ A,DSMAX,RMAX,THIN,B,THIN,DSEND	N	0100
12.	COMMON /FOR3SS/ID,DELS,XBK(20),YBK(20),XON(500),YON(500),PYDXD(500)	N	0110
13.	11,ALPHA(500),CAPPA(500),SON(500),PI0180	N	0120
14.	DATA NSMAX,NSS,EMPTY,ONE/300,200,1.0E20,1.0001/	N	0130
15.	NAMELIST /BGDYIN/ Z,S1	N	0140
16.	NAMELIST /AUXIN/ A,DSMAX,RMAX,THIN,B,NFIN,SP,NSP,DSEND,DONE,	N	0150
17.	FMEN,THIN	N	0160
18.		N	0170
19.C.....	INITIALIZE PROGRAM.	N	0180
20.	10 DO 15 I=1,NSMAX	N	0190
21.	15 Z(I)=EMPTY	N	0200
22.	S1=0.0	N	0210
23.	NPAX=400	N	0220
24.	A=.17	N	0230
25.	DSMAX=DELSMX	N	0240
26.	THIN=.FALSE.	N	0250
27.	RMAX=1.2	N	0260
28.	DSEND=DSMAX	N	0270
29.	DONE=.FALSE.	N	0280
30.	EVEN=.FALSE.	N	0290
31.	B=0.3	N	0300
32.	THIN=C.1	N	0310
33.	NFIN=0	N	0320
34.	NSP=0	N	0330
35.		N	0340
36.C.....	INPUT BODY POINTS AND BODY TYPE.	N	0350
37.	20 READ (NIN,BODYIN)	N	0360
38.	DO 25 I=1,NSMAX	N	0370
39.	IF (REAL(Z(I)).EQ.EMPTY) GO TO 30	N	0380
40.	25 NS=1	N	0390
41.	30 S(I)=S1	N	0400
42.	IBAD=SGEN(S,2,NS)	N	0410
43.	IF (IBAD.NE.0) WRITE (6,125)IBAD	N	0420
44.		N	0430
45.C.....	SET UP DERIVATIVES + CURVATURES.	N	0440
46.	DO 35 I=1,NS	N	0450
47.	35 DZ(I)=DZTRP(S,2,S(I),NS)	N	0460
48.	DO 40 I=1,NS	N	0470
49.	D2Z=DZTRP(S,DZ,S(I),NS)	N	0480
50.	40 C(I)=AIMAG(CONJG(DZ(I))*D2Z)/CABS(DZ(I))*3	N	0490
51.		N	0500
52.C.....	INPUT AUXILLIARY (CONTROL) DATA.	N	0510
53.	45 READ (NIN,AUXIN)	N	0520
54.	IF (NFIN.EQ.0) NFIN=NS	N	0530
55.	SFIN=S(NFIN)	N	0540
56.	DSMAX=AMAX1(DSMAX,DSEND)	N	0550

57.	IF (EVEN) GO TO 57	N	0560
58.		N	0570
59.C.....	GENERATE BODY POINTS ON A SEGMENT.	N	0580
60.	IF (.NOT.SPGEN(S,7,C,NS,SP,NSP,SFIN,NMAX)) GO TO 130	N	0590
61.	GO TO 40	N	0600
62.		N	0610
63.C.....	GENERATE UPPER AND LOWER SURFACES TOGETHER (EVEN).	N	0620
64.	50 SHALF=SFIN/2.0	N	0630
65.	IF (NSP.LY.1) GO TO 55	N	0640
66.	IF (SP(NSP).GE.SHALF/ONE) GO TO 60	N	0650
67.	55 IF (.NOT.SPGEN(S,7,C,NS,SP,NSP,SHALF,NMAX)) GO TO 140	N	0660
68.	60 SREM=(SFIN-SP(NSP))/ONE	N	0670
69.	DO 65 I=1,NSP	N	0680
70.	IF (SP(I).GE.SREM) GO TO 70	N	0690
71.	65 CONTINUE	N	0700
72.	GO TO 140	N	0710
73.	70 IF (NSP+1-1.GT.NMAX) GO TO 150	N	0720
74.	75 I=I+1	N	0730
75.	IF (I.LY.1) GO TO 60	N	0740
76.	NSP=NSP+1	N	0750
77.	SP(NSP)=SFIN-SP(I)	N	0760
78.	GO TO 75	N	0770
79.		N	0780
80.C.....	TEST FOR FINISH.	N	0790
81.	80 IF (DONE) GO TO 85	N	0800
82.	GO TO 45	N	0810
83.		N	0820
84.C.....	OUTPUT RESULTING ON-BODY POINTS.	N	0830
85.	85 DO 90 I=1,NSP	N	0840
86.	ZZ=FZTRP(S,7,SP(I),NS)	N	0850
87.	DZ(I)=DZTRP(S,7,SP(I),NS)	N	0860
88.	DZ=DZTRP(S,D7,SP(I),NS)	N	0870
89.	C(I)=ATNAG(CONJG(DZ(I))+DZ)/CABS(DZ(I))*43	N	0880
90.	X(I)=REAL(ZZ)	N	0890
91.	90 Y(I)=AIMAG(ZZ)	N	0900
92.	K1=KSTART	N	0910
93.	K2=NSP+KSTART-1	N	0920
94.	DO 110 I=K1,K2	N	0930
95.	II=I-KSTART+1	N	0940
96.	XON(II)=X(I)	N	0950
97.	YON(II)=Y(I)	N	0960
98.	CAPPA(II)=C(II)	N	0970
99.	IF (ABS(CAPPA(II)).LT..0001) CAPPA(II)=0.	N	0980
100.	IF (REAL(DZ(II)).EQ.0.) GO TO 100	N	0990
101.	DYDX(I)=AIMAG(DZ(II))/REAL(DZ(II))	N	1000
102.	IF (ABS(DYDX(I)).GT.999.) GO TO 100	N	1010
103.	IF (ABS(DYDX(I)).LT..0001) GO TO 95	N	1020
104.	ALPHA(I)=ATAN(DYDX(I))*180./3.14157	N	1030
105.	GO TO 105	N	1040
106.	95 DYDX(I)=0.	N	1050
107.	ALPHA(I)=0.	N	1060
108.	GO TO 105	N	1070
109.	100 DYDX(I)=999.	N	1080
110.	ALPHA(I)=90.	N	1090
111.	105 SON(I)=0.	N	1100
112.	IF (I.NE.1) SON(I)=SON(I-1)+SQRT((XON(I)-XON(I-1))*2+(YON(I)-YON(I-1)-N	N	1110
113.	111)*2)	N	1120

114.	IF(IINSEG.EQ.0.AND.II.EQ.1).OR.(J.EQ.1.AND.II.EQ.1))SON(I)=0.	N	1130
115.	IF (I.EQ.K1) GO TO 110	N	1140
116.	IF(XON(I).EQ.XON(I-1))CAPPA(I)=CAPPA(I-1)	N	1150
117.	IF (XON(I).EQ.XON(I-1)) GO TO 110	N	1160
118.	IF((DYDXO(I)-DYDXO(I-1))/(XON(I)-XON(I-1))*CAPPA(I).LT.0.)CAPPA(I)	N	1170
119.	I=-CAPPA(I)	N	1180
120.	IF(I.EQ.(K1+1))CAPPA(I-1)=SIGN(CAPPA(I-1),CAPPA(I))	N	1190
121.	IF(DYDXO(I)*DYDXO(I-1).LT.0..AND.DYDXO(I).GT.0.)CAPPA(I)=-ABS(CAPPN	N	1200
122.	1A(I))	N	1210
123.	IF (I.LT.(K1+2)) GO TO 110	N	1220
124.	IF (DYDXO(I)*DYDXO(I-2).LT.0.) GO TO 110	N	1230
125.	IF ((DYDXO(I-1).GT.DYDXO(I).AND.DYDXO(I-1).LT.DYDXO(I-2)).OR.(DYDXN	N	1240
126.	1O(I-1).LT.DYDXO(I).AND.DYDXO(I-1).GT.DYDXO(I-2))) GO TO 110	N	1250
127.	IF ((CAPPA(I-1).LE.CAPPA(I).AND.CAPPA(I-1).GE.CAPPA(I-2)).OR.(CAPPN	N	1260
128.	1A(I-1).GE.CAPPA(I).AND.CAPPA(I-1).LE.CAPPA(I-2))) GO TO 110	N	1270
129.	CAPPA(I-1)=-CAPPA(I-1)	N	1280
130.	110 CONTINUE	N	1290
131.	WRITE (6,115)NS,NSP,DSMAX,X(1),Y(1),X(NSP),Y(NSP)	N	1300
132.	115 FORMAT(1H0,7X,	N	1310
133.	1 58HD)PECT INTERPOLATION. FULL POINT-SPACING REQUIREMEN	N	1320
134.	175 MET./24X,19HNO. OF INPUT PTS.= ,14,2X,20HNO. OF OUTPUT PTS.= ,1N	N	1330
135.	24,2X,16HDSMAX = DSEND = ,F10.2/24X,14HSTART(X,Y) = (,F10.6,1H,,F10N	N	1340
136.	3.6,1H)/24X,12HCNO(X,Y) = (,F10.6,1H,,F10.6,1H))	N	1350
137.	IF (DONE) GO TO 120	N	1360
138.	120 RETURN	N	1370
139.	C.....ERROR MESSAGES.	N	1380
140.	125 FORMAT(20HSGEN FATLED. IBADE= ,I3)	N	1390
141.	130 WRITE (6,135)	N	1400
142.	135 FORMAT(13HSPGEN UNABLE TO COMPLETE SEGMENT)	N	1410
143.	STOP	N	1420
144.	140 WRITE (6,145)	N	1430
145.	145 FORMAT(29HSPGEN UNABLE TO DO EVEN BODY)	N	1440
146.	STOP	N	1450
147.	150 WRITE (6,155)NSP	N	1460
148.	155 FORMAT(144HTOO MANY POINTS FOR BOTH SURFACES. NLOWER= ,I4)	N	1470
149.	STOP	N	1480
150.	END	N	1490

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Program EOD

50.EOD		25 AUG 75	18
1.C	OVERLAY (PAN,0,0)		C
2.C	PROGRAM MAIN(INPUT=129,OUTPUT,PUNCH=129,TAPE5=INPUT,TAPE6=OUTPUT,		C
3.C	1 TAPE7=PUNCH,TAPE1=129,TAPE2=129,TAPE3=129,TAPE4=129,TAPE8=129,		C
4.C	2 TAPE9=129,TAPE10=129,TAPE11=129,TAPE12=129,TAPE13=129,TAPE15=129,		C
5.C	3 TAPE16=129)		C
6.C		MAIN	10
7.C*	** DOUGLAS PARABOLIC AXISYMMETRIC POTENTIAL FLOW PROGRAM **	MAIN	20
8.C		MAIN	30
9.C	* CALCULATION OF POTENTIAL FLOW ABOUT BODIES OF	MAIN	40
10.C	REVOLUTION HAVING FLOWS PARALLEL AND PERPENDICULAR	MAIN	50
11.C	TO THE AXIS OF REVOLUTION.	MAIN	60
12.C		MAIN	70
13.C	* MAIN PROGRAM	MAIN	80
14.C		MAIN	90
15.	COMMON /IPSF/ PSF	MAIN	100
16.	COMMON / NBSAVE / NBOLD, NIN	MAIN	110
17.	COMMON HEDR(10),CASE,NB, NNU	MAIN	130
18.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	MAIN	140
19.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	MAIN	150
20.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	MAIN	160
21.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	MAIN	170
22.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	MAIN	180
23.	COMMON NT, ND(11), MN, NUNA(5), TYPEA(5),	MAIN	190
24.	1 NER1, NER2, NMA, NSIGA, NSIGC,	MAIN	200
25.	2 NUNC(5), TYPEC(5), NLF(11), TEC, NSIGEC,	MAIN	210
26.	3 TYPEEC(5),NUNEC(5)	MAIN	220
27.	DOUBLE PRECISION HEDR,CASE	MAIN	230
28.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	MAIN	240
29.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	MAIN	250
30.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	MAIN	260
31.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	MAIN	270
32.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	MAIN	280
33.	COMMON /P/ IPUVEL	MAIN	290
34.	COMMON /BLOCK3/NOAXI,NOGROS,NOVORT,NOV1,NOV2,FIRSTE,LASTE,LSSE,SD,	MAIN	300
35.	1 NSMALL	MAIN	310
36.	COMMON /BLOCKR/ NRAKES,RNAME(20,9),RAKEA(20),RUNITX(20),	BAS1	340
37.	1 RUNITY(20),RDS(20),NRPTS(20),COSTH(20),IRAKE,NOFF,X1R(20),	BAS1	350
38.	2 Y1R(20),X2R(20),Y2R(20)	BAS1	360
39.	COMMON /PRINTF/ PRIN1,PRIN2,PRIN3	MTRX	110
40.	COMMON /ECF/ ECX(500),ECY(500),ECZ(500)	MTRX	340
41.	COMMON /COMBIN/CHAY(2)	AXIS	60
42.	COMMON /BLOCK5/ X,Y,SINAL,COSAL,HC,H,MM1,MP1,R	PRB3	100
43.	COMMON /D/ RISQR, R2SQR, XHXJ, YHYJ, XHXJP1, YHYJP1, S	XYZ2	70
44.	REAL MN	MAIN	320
45.C		MAIN	330
46.	CALL TSETV	MAIN	340
47.	NBOLD = 0	MAIN	120
48.	REWIND 13	MAIN	350
49.	10 REWIND 12	MAIN	360
50.	REWIND 4	MAIN	370
51.	REWIND 3	MAIN	380
52.	REWIND 8	MAIN	390
53.	REWIND 9	MAIN	400
54.	REWIND 10	MAIN	410
55.	REWIND 11	MAIN	420
56.	REWIND 15	MAIN	430

57.	REWIND 16	MAIN 440
58.	CALL PART1	MAIN 451
59.C	CALL OVERLAY (3HPAN,1,0,6HRECALL)	C
60.	WRITE(6, 20) T1, NSKALL	MAIN 470
61.	20 FORMAT(1H1, 22H MATRIX FORMATION TOOK, F14.3, 8H SECONDS ,	MAIN 480
62.	1 /" (THE NUMBER OF TIMES THAT SMALL ELEMENT FORMULAE WERE USED W	MAIN 490
63.	25*,16,*,*)	MAIN 500
64.C***	***PRESCRIBED VORTICITY IMPLIES TRIANGULARIZATION METHOD OF MATRIX	MAIN 510
65.C***	***SOLUTION (SOLVIT)	MAIN 520
66.	IF (FLG19.GT.0.OR.FLG13.GT.0) GO TO 30	MAIN 530
67.	CALL PART2	MAIN 541
68.C	CALL OVERLAY (3HPAN,2,0,6HRECALL)	C
69.	GO TO 50	MAIN 550
70.	30 CALL PREP	MAIN 561
71.C	30 CALL OVERLAY (3HPAN,3,0,6HRECALL)	C
72.	CALL TIMEV(T2)	MAIN 570
73.	T = T2 - T1	MAIN 580
74.	WRITE(6, 40) T	MAIN 590
75.	40 FORMAT(1H1, 42H MATRIX PREPARATION AND ALL SOLUTIONS TOOK, F14.3,	MAIN 600
76.	1 8H SECONDS)	MAIN 610
77.	50 CALL PART4	MAIN 621
78.C	50 CALL OVERLAY (3HPAN,4,0,6HRECALL)	C
79.	CALL TIMEV(T3)	MAIN 630
80.	T = T3 - T2	MAIN 640
81.	WRITE(6, 60) T	MAIN 650
82.	60 FORMAT(1H1, 43H MATRIX SUMMATIONS FOR FINAL SOLUTIONS TOOK, F14.3,	MAIN 660
83.	1 8H SECONDS)	MAIN 670
84.	GO TO 10	MAIN 680
85.	END	MAIN 690

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SO:ASTNE
1. FUNCTION ARSIN(X)
2. ARSIN=ASIN(X)
3. RETURN
4. END
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25 AUG 75 18

57.	30	READ (3) (SIG(I,N),I=1,NC)	AXIS 560
58.		IF (FLG19.LE.C) GO TO 90	AXIS 570
59.		READ (4)	AXIS 580
60.		NR = NMA+1	AXIS 590
61.		IF (FLG23 .GT. C) GO TO 40	AXIS 600
62.		READ (4) (SIG(I,1),I=NR,NT)	AXIS 610
63.		REWIND 4	AXIS 620
64.		GO TO 90	AXIS 630
65.C			AXIS 640
66.C			AXIS 650
67.C*** *		RING WING	AXIS 660
68.C			AXIS 670
69.	40	LIFBOD = 0	AXIS 680
70.		DO 50 K = 1,NP	AXIS 690
71.		IF (NLF(K) .GT. C) GO TO 50	AXIS 700
72.		LIFBOD = LIFBOD + 1	AXIS 710
73.	50	CONTINUE	AXIS 720
74.		LBP1 = LIFBOD + 1	AXIS 730
75.		DO 60 N=1,LBP1	AXIS 740
76.		DO 60 I=NR,NT	AXIS 750
77.	60	SIG(I,N) = C.C	AXIS 760
78.		LBP2 = LBP1 + 1	AXIS 770
79.		DO 70 N = LBP2,NSIG	AXIS 780
80.	70	READ(4) (SIG(I,N),I=NR,NT)	AXIS 790
81.		I=0	
82.		DO 75 N=LBP2,NSIG	
83.		I = I + 1	
84.	75	PVLAST(I) = SIG(NT,N)	
85.C		*** SIGMAS HERE HAVE BECOME THE INPUT PV	AXIS 800
86.		DO 80 N = LBP2,NSIG	AXIS 810
87.		DO 80 I=NR,NT	AXIS 820
88.	80	SIG(I,N) = SIG(I,N) / (-FOURPI)	AXIS 830
89.		REWIND 4	AXIS 840
90.C		* NO. OF MIDPOINTS LOOP	AXIS 850
91.	90	DO 200 I=1,NT	AXIS 860
92.C		* READ MATRICES A,B,Z	AXIS 870
93.		READ (9) (A(J),J=1,NT),(B(J),J=1,NT),(Z(J),J=1,NT)	AXIS 880
94.C		* NO. OF FLOWS LOOP	AXIS 890
95.		N1=0	AXIS 900
96.		DO 160 N=1,NSIG	AXIS 910
97.		N1=N1+2	AXIS 920
98.		SN=0.0	AXIS 930
99.		ST=0.0	AXIS 940
100.		SP=0.0	AXIS 950
101.C		* NO. OF ELEMENTS LOOP	AXIS 960
102.		DO 100 J=1,NT	AXIS 970
103.		SN=SN+A(J)*SIG(J,N)	AXIS 980
104.		ST=ST+B(J)*SIG(J,N)	AXIS 990
105.		IF (FLG23 .GT. C) Z(J) = 0.0	AXIS1000
106.	100	SP=SP+Z(J)*SIG(J,N)	AXIS1010
107.		IF (FLG22.GT.0) GO TO 150	AXIS1020
108.		IF (FLG12.EQ.0) GO TO 110	AXIS1030
109.		XN(I,N)=SN	AXIS1040
110.		PHI(I,N)=SP-RB(I,N1-1)	AXIS1050
111.		GO TO 120	AXIS1060
112.	110	XN(I,N)=SN-RB(I,N1-1)	AXIS1070
113.		PHI(I,N)=SP	AXIS1080

114.	120	IF (FLG11.EQ.0) GO TO 130	AXIS1090
115.		T(I,N)=ST	AXIS1100
116.		GO TO 140	AXIS1110
117.	130	T(I,N)=ST+RB(I,N1)	AXIS1120
118.	140	SUMM(N)=SUMM(N)+PHI(I,N)*Y2(I)*RB(I,N1-1)*DFLS(I)	AXIS1130
119.		CP(I,N)=1.-T(I,N)**2	AXIS1140
120.		GO TO 160	AXIS1150
121.	150	XN(I,N) = SN	AXIS1160
122.		PHI(I,N) = SP	AXIS1170
123.		T(I,N) = ST	AXIS1180
124.		CP(I,N) = 1.0 - T(I,N)**2	AXIS1190
125.	160	CONTINUE	AXIS1200
126.		IF (FLG08.EQ.0) GO TO 200	AXIS1210
127.		WRITE (6, 170) 1,(A(J),J=1,NT)	AXIS1220
128.	170	FORMAT (1H0 13H MATRIX A ROW I6/ (1H 10F10.5))	AXIS1230
129.		WRITE (6, 180) 1,(B(J),J=1,NT)	AXIS1240
130.	180	FORMAT (1H0 13H MATRIX B ROW I6/ (1H 10F10.5))	AXIS1250
131.		WRITE (6, 190) 1,(Z(J),J=1,NT)	AXIS1260
132.	190	FORMAT (1H0 13H MATRIX Z ROW I6/ (1H 10F10.5))	AXIS1270
133.	200	CONTINUE	AXIS1280
134.		IF (MN.EQ.0.0) GO TO 250	AXIS1290
135.C		* MACH NO. ADJUSTMENT	AXIS1300
136.		D1=MN*MN	AXIS1310
137.		D2=1.-D1	AXIS1320
138.		D3=SQRT(D2)	AXIS1330
139.		D4=.7*D1	AXIS1340
140.		D5=.2*D1	AXIS1350
141.		DO 210 N=1,NSIG	AXIS1360
142.		DO 210 I=1,NT	AXIS1370
143.		TX=(T(I,N)*COS(A(I)-1.)/D2+1.	AXIS1380
144.		TY = (T(I,N) * SIN(A(I))) / D3	AXIS1390
145.		T(I,N)=SQRT(TX*TX+TY*TY)	AXIS1400
146.	210	CP(I,N)=((1.+D5*(1.-T(I,N)**2))**.5-1.)/D4	AXIS1410
147.C		* ELIMINATE MACH NO EFFECT FOR PRINTOUT	AXIS1420
148.		DO 220 I=1,N1	AXIS1430
149.	220	X1(I)=X1(I)*D3	AXIS1440
150.		N=0	AXIS1450
151.		J1=0	AXIS1460
152.		DO 240 K=1,NB	AXIS1470
153.		M=N+1	AXIS1480
154.		N=N+ND(K)-1	AXIS1490
155.		DO 230 J=M,N	AXIS1500
156.		J1=J1+1	AXIS1510
157.		T1=X1(J1+1)-X1(J1)	AXIS1520
158.		T2=Y1(J1+1)-Y1(J1)	AXIS1530
159.		X2(J)=(X1(J1+1)+X1(J1))/2.	AXIS1540
160.		DELS(J)=SQRT(T1*T1+T2*T2)	AXIS1550
161.		COSA(J)=T1/DELS(J)	AXIS1560
162.	230	SINA(J)=T2/DELS(J)	AXIS1570
163.	240	J1=J1+1	AXIS1580
164.C		* PRINT AXIS FLOW (ON-BODY) OUTPUT	AXIS1590
165.	250	DO 450 L=1,NSIG	AXIS1600
166.		KA = L	AXIS1610
167.		IF (FLG16.LE.0) KA=L-1	AXIS1620
168.		IF (FLG22.GT.0 .OR. FLG23.GT.0) KA = L	AXIS1630
169.		IF (FLG22.GT.0) GO TO 270	AXIS1640
170.		SUMM(L)=-6.2831853*SUMM(L)	AXIS1650

171.	DO 260 J = 1, NT	AXIS1660
172.	260 SUMTDS(L) = SUMTDS(L) + T(J,L)*DELS(J)	AXIS1670
173.	270 I = 1	AXIS1680
174.	J=1	AXIS1690
175.	M=1	AXIS1700
176.	N=ND(M)	AXIS1710
177.	LCTR=22	AXIS1720
178.	280 WRITE(6, 290)HEDR,CASE,PSF	AXIS1730
179.	290 FORMAT(1H1 25X, 26HDOUGLAS AIRCRAFT COMPANY /	AXIS1740
180.	1 28X, 21HLONG BEACH DIVISION ///	AXIS1750
181.	2 6X,10A6,4X,10HCASE NO. A6,10H PSF = ,A4 ///	AXIS1760
182.	IF (FLG22.GT.0) GO TO 350	AXIS1770
183.	IF (L.GT.1.OR.FLG16.NF.0) GO TO 310	AXIS1780
184.	WRITE(6, 300)	AXIS1790
185.	300 FORMAT(1H 34H ON-BODY UNIFORM AXISYMMETRIC FLOW)	AXIS1800
186.	GO TO 370	AXIS1810
187.	310 IF (TYPEA(KA).GE.2.0) GO TO 330	AXIS1820
188.	WRITE(6, 320)	AXIS1830
189.	320 FORMAT(1H 44H FLOW GENERATOR * ROTATING BODY * TYPE ERROR)	AXIS1840
190.	330 IF (NUNA(KA).EQ.123456) WRITE(6, 340)	AXIS1850
191.	340 FORMAT(27H ON-BODY STRIP VORTEX FLOW)	AXIS1860
192.	350 IF (NUNA(KA).NE.123456) WRITE(6, 360)NUNA(KA)	AXIS1870
193.	360 FORMAT(1H 42H ON-BODY NON-UNIFORM AXISYMMETRIC FLOW NO. Y8)	AXIS1880
194.	370 WRITE(6, 380)	AXIS1890
195.	380 FORMAT(1H 5X 24H TRANSFORMED COORDINATES //	AXIS1900
196.	1 12X 1HX 13X 1HY 13X 2HT1 12X 2HCP 9X 5HSIN A	AXIS1910
197.	2 6X 5HCOS A 7X 5HSIGMA 11X 1HN 13X 3HPHI ///	AXIS1920
198.	390 WRITE(6, 400) I,X1(I),Y1(I),X2(J),Y2(J), T(J,L),CP(J,L),	AXIS1930
199.	1 SINA(J),COSA(J),SIG(J,L),XN(J,L),PHI(J,L)	AXIS1940
200.	400 FORMAT(1H I3,2F14.7/ 4X 4F14.7,2F11.5,3F14.7)	AXIS1950
201.	I=I+1	AXIS1960
202.	J=J+1	AXIS1970
203.	IF (I.EQ.N) GO TO 410	AXIS1980
204.	IF (I.LE.LCTR) GO TO 390	AXIS1990
205.	LCTR=LCTR+22	AXIS2000
206.	GO TO 280	AXIS2010
207.	410 M=M+1	AXIS2020
208.	N=N+ND(M)	AXIS2030
209.	WRITE(6, 420) I,X1(I),Y1(I)	AXIS2040
210.	420 FORMAT(1H I3, 2F14.7 ///	AXIS2050
211.	I=I+1	AXIS2060
212.	IF (J - NT) 390, 430, 430	AXIS2070
213.	430 IF(FLG22.GT.0) GO TO 450	AXIS2080
214.	WRITE(6, 440) SUMM(L), SUMV, SUMTDS(L)	AXIS2090
215.	440 FORMAT(1H 10X 13H ADDED MASS =F20.7, 4X 9H VOLUME = F20.7,	AXIS
216.	1 5X 18HSUM (T)(DEFLA S) = F20.7)	
217.	450 CONTINUE	AXIS2120
218.	IF (IPUVEL .EQ. 0) GO TO 460	AXIS2130
219.	WRITE(6, 720)	AXIS2140
220.	LOC = 100	AXIS2150
221.	CALL PUNCHC (X2, NT, LOC, CASE)	AXIS2160
222.	LOC = 500	AXIS2170
223.	CALL PUNCHC (Y2, NT, LOC, CASE)	AXIS2180
224.	LOC = 900	AXIS2190
225.	CALL PUNCHV (T, NT, NSJG, LOC, CASE)	AXIS2200
226.	460 LL = 1	AXIS2210
227.	IF(FLG23 .GT. C)CALL COMBO(LL)	AXIS2220

228.	IF (FLG05.EQ.0) RETURN	AXIS2230
229.C	* OFF-BODY POINT	AXIS2240
230.	IF (FLG15.LE.0) GO TO 500	AXIS2250
231.	M = 0	AXIS2260
232.	DO 470 I = 1, NR	AXIS2270
233. 470	IF (INLF(I).LE.0) M = M + 1	AXIS2280
234.	IF (M.EQ.0) GO TO 500	AXIS2290
235.	MM = NNU + 1	AXIS2300
236.	IF (FLG23.GT.0) IMM = MM + NNU	AXIS2310
237.	DO 480 I = 1, MM	AXIS2320
238. 480	READ (4)	AXIS2330
239.	IF (FLG22.GT.0) READ (4)	AXIS2340
240.	IF (FLG23.GT.0) GO TO 486	
241.	DO 482 J = 1, M	
242.482	READ (4) (RB(I,J), I = 1, NP), (T3(I,J), I = 1, NP)	
243.	GO TO 498	
244.486	IF ((FLG05.EQ.1).AND.(FLG23.EQ.1).AND.(M.EQ.1)) READ (4)	
245.	M1 = 0	
246.	DO 495 KA = 1, NSIG	
247.	IF (NUNA(KA).EQ.123456) M1 = M1 + 1	
248.495	CONTINUE	
249.	DO 490 J = 1, M1	
250. 490	READ (4) (RB(I,J), I = 1, NP), (T3(I,J), I = 1, NP)	AXIS2360
251.C	MULTIPLY NOTS ONSET FLOW BY INPUT PV	
252.	J1 = M1 - FLG14 + 1	
253.	I = 0	
254.	DO 496 J = J1, M1	
255.	I = I + 1	
256.	PVSINF = PVLAST(I)	
257.	DO 496 II = 1, NP	
258.	RB(II,J) = PVSINF * RB(II,J)	
259.496	T3(II,J) = PVSINF * T3(II,J)	
260.498	REWIND 4	
261. 500	DO 550 I = 1, NP	AXIS2370
262.	L = 0	AXIS2380
263.C	* READ MATRICES X,Y,Z	AXIS2390
264.	READ (9) (A(I), I = 1, NT), (B(I), I = 1, NT), (Z(I), I = 1, NT)	AXIS2400
265.C	* NO. OF FLOW	AXIS2410
266.	DO 550 N = 1, NSIG	AXIS2420
267.	KA = N	AXIS2430
268.	IF (FLG16.LE.0) KA = N - 1	AXIS2440
269.	SX = 0.0	AXIS2450
270.	SY = 0.0	AXIS2460
271.	SP = 0.0	AXIS2470
272.C	* NO. OF ELEMENTS LOOP	AXIS2480
273.	DO 510 J = 1, NT	AXIS2490
274.	SX = SX + A(J) * SIG(J, N)	AXIS2500
275.	SY = SY + B(J) * SIG(J, N)	AXIS2510
276.	IF (FLG23.GT.0) Z(J) = 0.0	AXIS2520
277. 510	SP = SP + Z(J) * SIG(J, N)	AXIS2530
278.	PHI(I, N) = SP	AXIS2540
279.	IF (FLG22.GT.0) GO TO 530	AXIS2550
280.	IF (FLG11.GT.0) GO TO 530	AXIS2560
281.	IF (N.NE.1.OR.FLG16.GT.0) GO TO 520	AXIS2570
282.	VX(I, N) = SX + I.	AXIS2580
283.	GO TO 540	AXIS2590
284. 520	IF (NUNA(KA).NE.123456) GO TO 530	AXIS2600
		AXIS2610

285.	L=L+1	AXIS2620
286.	VX(I,N)=SX+RB(I,L)	AXIS2630
287.	VY(I,N)=SY+I3(I,L)	AXIS2640
288.	GO TO 580	AXIS2650
289.	530 VX(I,N) = SX	AXIS2660
290.	540 VY(I,N) = SY	AXIS2670
291.	550 CONTINUE	AXIS2680
292.	IF (HNEQ,U.O) GO TO 580	AXIS2690
293.C	* MACH NO. ADJUSTMENT	AXIS2700
294.	DO 560 N=1,NSIG	AXIS2710
295.	DO 560 I=1,NP	AXIS2720
296.	VY(I,N)=VY(I,N)/D3	AXIS2730
297.	560 VX(I,N)=(VX(I,N)-1.1)/D2+1.	AXIS2740
298.	DO 570 I = 1, NP	AXIS2750
299.	570 XP(I)=XP(I)*D3	AXIS2760
300.C	* COMPUTE VT AND THETA	AXIS2770
301.	580 DO 590 N=1,NSIG	AXIS2780
302.	DO 590 I=1,NP	AXIS2790
303.	VY(I,N)=SQRT(VX(I,N)**2+VY(I,N)**2)	AXIS2800
304.	590 TH(I,N)=ATAN2(VY(I,N),VX(I,N)) * 57.29578	AXIS2810
305.C	* PRINT AXIS FLOW (OFF-BODY) OUTPUT	AXIS2820
306.	DO 710 L=1,NSIG	AXIS2830
307.	KA = L	AXIS2840
308.	IF (FLG16 .LE. C) KA = L - 1	AXIS2850
309.	IF (FLG22 .GT. C .OR. FLG23 .GT. C) KA = L	AXIS2860
310.	I=1	AXIS2870
311.	LCTR=43	
312.	600 WRITE(6, 290) HED9,CASE,PSF	AXIS2890
313.	IF (L.GT.1.OR.FLG16.NE.C) GO TO 620	AXIS2900
314.	IF (FLG22.GT.C) GO TO 650	AXIS2910
315.	WRITE (6, 610)	AXIS2920
316.	610 FORMAT (1H 35H OFF-BODY UNIFORM AXISYMMETRIC FLOW)	AXIS2930
317.	GO TO 670	AXIS2940
318.	620 IF (TYPEA(KA).GE.C.) GO TO 630	AXIS2950
319.	WRITE (6, 320)	AXIS2960
320.	630 IF (NUNA(KA).EQ.123456) WRITE (6, 640)	AXIS2970
321.	640 FORMAT (28H OFF-BODY STRIP VORTEX FLOW)	AXIS2980
322.	650 IF (NUNA(KA).NE.123456) WRITE (6, 660) NUNA(KA)	AXIS2990
323.	660 FORMAT (1H 43H OFF-BODY NON-UNIFORM AXISYMMETRIC FLOW NO. 18)	AXIS3000
324.	670 WRITE (6, 680)	AXIS3010
325.	680 FORMAT (1H 5X, 24H TRANSFORMED COORDINATES //	AXIS3020
326.	1 12X 1HX 13X 1HY 13X 2HVN 12X 2HVN 12X 2HVN 10X	AXIS3030
327.	2 5HTHETA 11X 3HPhi //	AXIS3040
328.	690 WRITE (6, 700) I,XP(I),YP(I), VX(I,L),VY(I,L),VT(I,L),	AXIS3050
329.	1 TH(I,L), PHI(I,L)	AXIS3060
330.	700 FORMAT (1H 13, 7F14.7)	AXIS3070
331.	I=I+1	AXIS3080
332.	IF (I.GT.NP) GO TO 710	AXIS3090
333.	IF (I.LE.LCTR) GO TO 690	AXIS3100
334.	LCTR=LCTR+43	
335.	GO TO 600	AXIS3120
336.	710 CONTINUE	AXIS3130
337.	IF (IRAKE .EQ. 1) CALL RAKFLO(VX,VY,NSIG)	AXIS3140
338.	LL = C	AXIS3150
339.	IF (FLG23 .GT. C) CALL COMBO(LL)	AXIS3160
340.	IF (IPUVEL .EQ. 0) RETURN	AXIS3170
341.	WRITE(6, 720)	AXIS3180

342.	720 FORMAT(IH1,88H THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET	AXIS3190
343.	1PUNCHED WHEN THERE IS PUNCHED OUTPUT///)	AXIS3200
344.	LOC = 2500	AXIS3210
345.	CALL PUNCHC (XP, NP, LOC, CASE)	AXIS3220
346.	LOC = 2900	AXIS3230
347.	CALL PUNCHC (YP, NP, LOC, CASE)	AXIS3240
348.	LOC = 3300	AXIS3250
349.	CALL PUNCHV (VX, NP, NSIG, LOC, CASE)	AXIS3260
350.	LOC = 4900	AXIS3270
351.	CALL PUNCHV (VY, NP, NSIG, LOC, CASE)	AXIS3280
352.	RETURN	AXIS3290
353.	END	AXIS3300

SO,BAS1		20 OCT 76	14
1.	SUBROUTINE BASIC1	BAS1	20
2.C		BAS1	10
3.C		BAS1	30
4.C	* READ DATA AND SETUP FOR UNIFORM FLOW	BAS1	40
5.C		BAS1	50
6.	COMMON / NBSAVE / NBOLD, NIN	BAS1	60
7.	COMMON /BLOCK1/ IGEOMF(9),ISIGF(9),IPNCHF,NONEW(9)	BAS1	70
8.	COMMON /BLOCK2/ HCURV(500),HARC(500)	BAS1	80
9.	COMMON/CURVPR/ IEL2		
10.	COMMON HEDR(10),CASE,NB,NNU	BAS1	90
11.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	BAS1	100
12.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	BAS1	110
13.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	BAS1	120
14.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	BAS1	130
15.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	BAS1	140
16.	COMMON NT, ND(11), MN, NUNA(5), TYPEA(5),	BAS1	150
17.	1 NCR1, NCR2, NMA, NSIGA, NSIGC,	BAS1	160
18.	2 NUNC(5), TYPEC(5), NLF(11), IEC, NSIGEC,	BAS1	170
19.	3 TYPEEC(5),NUMEC(5)	BAS1	180
20.	DOUBLE PRECISION HEDR, CASE	BAS1	190
21.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	BAS1	200
22.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	BAS1	210
23.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	BAS1	220
24.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	BAS1	230
25.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	BAS1	240
26.	DIMENSION COSSOR(500), RHS(500)	BAS1	250
27.	REAL MN	BAS1	260
28.C		BAS1	270
29.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELL(500),	BAS1	280
30.	1 SINA(500),COSA(500),XP(500), YP(500)	BAS1	290
31.	2 ,XWAKE(11),YWAKE(11)	BAS1	300
32.	COMMON /TL/ TX1(500), TY1(500), NG(500), TG(500), ALFA(500),	BAS1	310
33.	1 RSDS(500),DALF(500),	BAS1	320
34.	2 CHORD, TEMP(600),TCNST, DUMMY(5915)	BAS1	330
35.	COMMON /BLOCKR/ NRAKES,RNAME(20,9),RAKEA(20),RUNITYX(20),	BAS1	340
36.	1 RUNITY(20),RDS(20),NRPTS(20),COSTH(20),IRAKF,NOFF,X1R(20),	BAS1	350
37.	2 Y1R(20),X2R(20),Y2R(20)	BAS1	360
38.	DIMENSION UTX1(500),UTY1(500),X(500),Y(500),DELLSQ(500),	BAS1	370
39.	1 HCURVQ(500)	BAS1	380
40.	EQUIVALENCE (UTX1(1),DUMMY(1)),(UTY1(1),DUMMY(501)),(TX1(1),X(1)),	BAS1	390
41.	1 (TY1(1),Y(1)),(DELLSQ(1),DUMMY(1001)),(HCURVQ(1),DUMMY(1501))	BAS1	400
42.	INTEGER BDN ,SUBKS	BAS1	420
43.	REAL MX ,MY ,NG	BAS1	430
44.	LOGICAL NONEW,NORAKS	BAS1	440
45.	DATA LCMAX/40/		
46.C	NOTE ... THE HALF-ARC LENGTH ARRAY (HARC) SHOULD NOT BE CONFUSED WITH	BAS1	450
47.C	THE (STRAIGHT LINE) FULL-ELEMENT LENGTH ARRAY (DELL), SINCE THE FIRST	BAS1	460
48.C	IS MEASURED ALONG THE ARC WHILE THE SECOND IS NOTHING MORE THAN THE	BAS1	470
49.C	STRAIGHT LINE DISTANCE BETWEEN THE ELEMENT ENDPOINTS. NOTE HT	BAS1	480
50.C	STRAIGHT LINE DISTANCE BETWEEN THE ELEMENT ENDPOINTS. NOTE THAT FOR	BAS1	490
51.C	THE FLAT ELEMENT CASE, THESE DIFFER ONLY BY A FACTOR OF 2. IN SOME	BAS1	500
52.C	ROUTINES (ESP. XY7, XY21, XY22) DELL IS CALLED DELS IN COMMON /CL/.	BAS1	510
53.C		BAS1	520
54.C	* START	BAS1	530
55.	NT=0	BAS1	540
56.	J1=0	BAS1	550

57.	K2=NB	BAS1 560
58.	IEL1 = 1	BAS1 570
59.	IF (NIN .EQ. 0) NIN = 5	BAS1 580
60.	IF ((FLG05.NE.0) .OR. (IRAKF.EQ.1)) K2 = NB + 1	BAS1 590
61.	NORAKS = .TRUE.	BAS1 600
62.	IF (IRAKF .EQ. 1) NORAKS = .FALSE.	BAS1 610
63.	NOFF = 0	BAS1 620
64.C	* MAJOR LOOP * NO. OF BODIES * OFF BODY POINTS	BAS1 630
65.	LCNT = 0	BAS1 640
66.	DO 510 L=1,K2	BAS1 650
67.	READ (5, 10) IGEOMF(L),ISIGF(L),ICURVN,NONEWF,IFORMT,	BAS1 660
68.	1 NN,MX,MY,THETA,ADDX,ADDY	BAS1 670
69.	10 FORMAT(5I1,15,5F10.0)	BAS1 680
70.	NONEW(L) = .FALSE.	BAS1 690
71.	IF (NONEWF .EQ. 1) NONNEW(L) = .TRUE.	BAS1 700
72.	IF ((L.EQ.(NB+1)) .AND. (FLG05.EQ.0)) GO TO 140	BAS1 710
73.	READ (5, 20) BDN,SUBKS,NLF(L),XC,YC	BAS1 720
74.	20 FORMAT (3I5X,15,2F10.0)	BAS1 730
75.	NDEL=NN	BAS1 740
76.	IF (BDN .EQ. 0) NOFF = NN	BAS1 750
77.C***	***NDEL IS THE NUMBER OF POINTS ON BODY L, OR THE NUMBER OF OFF	BAS1 760
78.C***	***BODY POINTS FOR L = NB + 1	BAS1 770
79.	IF (BDN .EQ. 0) GO TO 30	BAS1 780
80.	M = NN - 1	BAS1 790
81.	IEL2 = IEL1 + M - 1	BAS1 800
82.	30 CONTINUE	BAS1 810
83.	IF (SUBKS) 40 , 70 , 40	BAS1 820
84.	40 IF (L.NE. K2) GO TO 60	BAS1 830
85.	NTIMES = NBOLD - NB	BAS1 840
86.	IF (NTIMES .LE. 0) GO TO 60	BAS1 850
87.	DO 50 NSKIPS = 1, NTIMES	BAS1 860
88.	50 READ (13)	BAS1 870
89.	60 READ (13) (UTX1(I),I=1,NN),(UTY1(I),I=1,NN)	BAS1 880
90.	GO TO 150	BAS1 890
91.	70 IF (BDN.EQ.0) GO TO 100	BAS1 900
92.	IF (FLG07) 80 , 100 , 80	BAS1 910
93.C	* ELLIPSE GENERATOR FOR X1 AND Y1	BAS1 920
94.	80 IF (XF.EQ.0.0) XE=1.	BAS1 930
95.	IF (YE.EQ.0.0) YE=1.	BAS1 940
96.	EN=M	BAS1 950
97.	DGAM=3.141593 /EN	BAS1 960
98.	GAM=3.141593	BAS1 970
99.	DO 90 I=1,NN	BAS1 980
100.	UTX1(I) = XE*COS(GAM)	BAS1 990
101.	UTY1(I) = YE*SIN(GAM)	BAS11000
102.	90 GAM=GAM-DGAM	BAS11010
103.	GO TO 150	BAS11020
104.C		BAS11030
105.C	* READ X1 AND Y1 FROM INPUT CARDS	BAS11040
106.	100 IF (IFORMT .EQ. 2) GO TO 120	BAS11050
107.	IF (IFORMT .EQ. 1) GO TO 110	BAS11060
108.C		BAS11070
109.C	IFORMT=0 ...	BAS11080
110.	READ (NIN, 710) (UTX1(I),I=1,NN)	BAS11090
111.	READ (NIN, 710) (UTY1(I),I=1,NN)	BAS11100
112.	GO TO 130	BAS11110
113.C		BAS11120

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114.C IFORNT=1 ...
115. 110 READ (NIN, 790) (UTX1(I),UTY1(I),I=1,NN)
116. GO TO 130
117.C
118.C IFORNT=2 ...
119. 120 READ (NIN, 800) (UTX1(I),UTY1(I),I=1,NN)
120.C
121. 130 IF (L.NE.(NR+1)) GO TO 150
122. IF (IRAKE.NE.1) GO TO 150
123.C
124.C READ IN AUTOMATIC MASS FLOW RAKE GENERATION INFORMATION ...
125. READ (5, 20) NN
126. 140 NRAKES = NN
127. NI = NOFF + 1
128. CALL IRAKES(UTX1(NI),UTY1(NI),NNR)
129. NN = NOFF + NNR
130. ND(L) = NN
131. FLG05 = 1
132. BDN = 0
133.C
134.C
135.C INITIALIZE ELEMENT CURVATURE VALUES ...
136. 150 DO 160 II=IEL1,IEL2
137. 160 HCURV(II) = 0.0
138.C
139. IF (ICURVN.EQ.0) GO TO 180
140. READ (NIN, 710) (HCURV(II),II=IEL1,IEL2)
141. DO 170 II=IEL1,IEL2
142. 170 HCURV(II) = 0.5*HCURV(II)
143. 180 CONTINUE
144.C
145.C** BODIES NO. (NB-FLG14+1) TO (NB) ARE PRESCRIBED VORTICITY BODIES.
146.C
147. IF (FLG23.LE.0.OR.(L.LE.NB-FLG14.OR.L.GT.NB))GO TO 190
148.C
149.C*** * IF CONTROL REACHES THIS POINT, RING WING OPTION IS IN EFFECT AND
150.C*** * L IS A PRESCRIBED VORTICITY BODY
151.C *** LCNT IS THE RELATIVE NUMBER OF THE WAKE BODY STARTING WITH 1
152.C
153. LCNT = LCNT + 1
154. XWAKE(LCNT) = UTX1(NN)
155. YWAKE(LCNT) = UTY1(NN)
156.C * SAVE X1 AND Y1 FOR SUBCASE
157. 190 IF (SUBKS.EQ.0) WRITE(13)(UTX1(I),I=1,NN),(UTY1(I),I=1,NN)
158.C
159.C CALCULATE TRANSFORMED COORDINATES ...
160. DO 200 I=1,NN
161. TX1(I) = UTX1(I)
162. 200 TY1(I) = UTY1(I)
163.C NOTE THAT (X AND TX1) AND (Y AND TY1) ARE EQUIVALENCED.
164.C
165. IF (MX.EQ.0.0) GO TO 220
166. DO 210 I=1,NN
167. 210 TX1(I) = TX1(I) * MX
168.C
169. 220 IF (MY.EQ.0.0) GO TO 240
170. DO 230 I=1,NN

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171. 230 TY1(I) = TY1(I) * MY
172.C
173. 240 IF (THETA.EQ. 0.0) GO TO 260
174. CT = COS(THETA/57.29578)
175. ST = SIN(THETA/57.29578)
176. DO 250 I=1,NN
177. TEMP1 = TX1(I)
178. TX1(I) = TEMP1*CT + TY1(I)*ST
179. 250 TY1(I) = TY1(I)*CT - TEMP1*ST
180.C
181. 260 IF (ADDDX.EQ. 0.0) GO TO 280
182. DO 270 I=1,NN
183. 270 TX1(I) = TX1(I) + ADDX
184.C
185. 280 IF (ADDDY.EQ. 0.0) GO TO 300
186. DO 290 I=1,NN
187. 290 TY1(I) = TY1(I) + ADDY
188.C
189. 300 IF ((CHORD.EQ.0.0) .OR. (CHORD.EQ.1.0)) GO TO 320
190. DO 310 I=1,NN
191. TX1(I) = TX1(I) / CHORD
192. 310 TY1(I) = TY1(I) / CHORD
193.C
194. 320 IF (MN.EQ. 0.0) GO TO 340
195. BETA = SORT(1.0 - MN*MN)
196. DO 330 I=1,NN
197. 330 TX1(I) = TX1(I) / BETA
198.C
199.C
200. 340 NNM1 = NN - 1
201. NNM2 = NN - 2
202. IF (BDN.EQ. 0) GO TO 450
203.C
204.C CALCULATE FLAT ELEMENT LENGTHS, ETC. ...
205. DO 350 I=1,NNM1
206. II = IEL1 + I - 1
207. DELX = X(I+1) - X(I)
208. DELY = Y(I+1) - Y(I)
209. DELLSQ(I) = DELX*DELX + DELY*DELY
210. DELL(I) = SORT(DELLSQ(I))
211. HARC(I) = DELL(I)/2.0
212. X2(I) = (X(I) + X(I+1)) / 2.0
213. Y2(I) = (Y(I) + Y(I+1)) / 2.0
214. COSA(I) = DELX / DELL(I)
215. SINA(I) = DELY / DELL(I)
216. 350 ALFA(I) = ATAN2(DELY, DELX)
217.C
218. DALF(I) = 0.0
219. DO 360 I=2,NNM1
220. 360 DALF(I) = (ALFA(I) - ALFA(I-1)) * 57.29578
221. IF (IGEOMFIL.NE. 0) GO TO 410
222. IF (ICURVN.NE. 0) GO TO 390
223.C
224.C CALCULATE THE HALF-CURVATURES VALUES OF ALL THE (NN-2) POSSIBLE ARCS.
225. DO 370 I=1,NNM2
226. II = IEL1 + I - 1
227. J = I + 1

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228.      K = I + 2
229.      D = 4.0*((X(J)-X(I))*Y(J)-Y(K))-(X(J)-X(K))*Y(J)-Y(I) )
230.      DH = 2.0*((X(I)*X(I) + Y(I)*Y(I))*Y(K) - Y(J) ) +
231.      1 (X(J)*X(J) + Y(J)*Y(J))*Y(I) - Y(K) ) +
232.      2 (X(K)*X(K) + Y(K)*Y(K))*Y(J) - Y(I) )
233.      DK = 2.0*((X(I)*X(I) + Y(I)*Y(I))*X(J) - X(K) ) +
234.      1 (X(J)*X(J) + Y(J)*Y(J))*X(K) - X(I) ) +
235.      2 (X(K)*X(K) + Y(K)*Y(K))*X(I) - X(J) )
236.      R = SQRT( (D*X(J)-DH)**2 + (D*Y(J)-DK)**2 )
237.      HCURVD(II) = -0.5 * D / R
238.      370 CONTINUE
239.C
240.C NOW COMPUTE THE GEOMETRIC MEANS OVER THE 2 ARCS (EXCEPT FOR THE
241.C FIRST AND LAST) ...
242.      HCURV(IEL1) = HCURVD(IEL1)
243.      HCURV(IEL2) = HCURVD(IEL2-1)
244.      DO 380 I=2,NNM2
245.      II = IEL1 + I - 1
246.      H1H2 = HCURVD(II-1)*HCURVD(II)
247.      IF (H1H2 .GT. 0.0) GO TO 385
248.      HCURV(II) = 0.0
249.      GO TO 380
250.C
251.      385 HCURV(II) = SQRT(H1H2)
252.      IF (HCURVD(II) .LT. 0.0) HCURV(II) = -HCURV(II)
253.      380 CONTINUE
254.C
255.C NOW CALCULATE CONTROL POINT LOCATIONS AND HALF-ARC LENGTHS ...
256.      390 DO 400 I=1,NNM1
257.      II = IEL1 + I - 1
258.      ETAC = -HCURV(II)*DELLSQ(II) / 4.0
259.      X2(II) = X2(II) - ETAC*SINA(II)
260.      Y2(II) = Y2(II) + ETAC*COSA(II)
261.      400 HARC(II) = (DELL(II)/2.0)*(1.0 + (HCURV(II)**2)*DELLSQ(II) / 6.0 )
262.C
263.C CAN NOW COMPUTE RUNNING ARC LENGTHS ...
264.      410 RSDS(1) = 2.*HARC(IEL1)
265.      DO 420 I=1,NNM2
266.      420 RSDS(I+1) = RSDS(I) + 2.*HARC(IEL1 + I - 1)
267.C
268.C PRINT THE RESULTS FOR ON-BODY POINTS ...
269.      LC = LCMAX
270.      DO 440 I=1,NNM1
271.      II = IEL1 + I - 1
272.      IF (LC .LT. LCMAX) GO TO 430
273.      LC = 0
274.      WRITE (6, 720 ) HEDR,NN,MX,MY,THETA,ADDX,ADDY,XE,YE
275.      IF (IGCOMF(L).EQ.0) WRITE (6, 620 ) IGCOMF(L)
276.      IF (IGCOMF(L).NE.0) WRITE (6, 630 ) IGCOMF(L)
277.      IF (ISIGF(L).EQ.0) WRITE (6, 640 ) ISIGF(L)
278.      IF (ISIGF(L).EQ.1) WRITE (6, 650 ) ISIGF(L)
279.      IF (ISIGF(L).GE.2) WRITE(6, 660 ) ISIGF(L)
280.      IF (ICURVN.EQ.0) WRITE (6, 670 ) ICURVN
281.      IF (ICURVN.NE.0) WRITE (6, 680 ) ICURVN
282.      IF (.NOT. NONNEW(L)) WRITE (6, 690 )
283.      IF(NONNEW(L)) WRITE(6,700)
284.      WRITE(6,760)

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285.      WRITE(6,730)
286.430  WRITE(6,740) I,UTX1(I),UTY1(I),TX1(I),TY1(I)
287.      CURV = 2.0*HCURV(II)
288.      ARCL = 2.0*HARC(II)
289.      WRITE (6, 750 ) X2(II),Y2(II),ARCL      ,RSDS(II),DALF(II),CUPV
290.  440  LC = LC + 2
291.      WRITE (6, 740 ) NN,UTX1(NN),UTY1(NN),TX1(NN),TY1(NN)
292.C
293.      GO TO 490
294.C
295.C PRINT RESULTS FOR OFF-BODY POINTS ...
296.  450  LC = LC MAX
297.      IRAKE = 1
298.      IRPT = 0
299.      DO 470 I=1,NN
300.      IF (LC .LT. LC MAX) GO TO 460
301.      LC = 0
302.      WRITE (6, 720 ) HCDR,NN,MX,MY,THETA,ADDX,ADDY,XC,YC
303.      WRITE (6, 770 )
304.      WRITE (6, 780 )
305.  460  WRITE (6, 740 ) I,UTX1(I),UTY1(I),TX1(I),TY1(I)
306.      IF (NORAKS) GO TO 470
307.C
308.      IF (I .LE. NOFF) GO TO 470
309.C THIS MUST BE ANOTHER RAKE POINT ...
310.      IF (IRPT .EQ. 0) WRITE (6, 810 ) (RNAME(IRAKE,II),II=1,9)
311.      IRPT = IRPT + 1
312.      IF (IRPT .LT. NRPTS(IRAKE)) GO TO 470
313.      IRAKE = IRAKE + 1
314.      IRPT = 0
315.C
316.  470  LC = LC + 1
317.C
318.C
319.      DO 480 I=1,NN
320.      XP(I)=TX1(I)
321.  480  YP(I)=TY1(I)
322.      WRITE (12) (XP(I),I=1,NN),(YP(I),I=1,NN)
323.      GO TO 510
324.C
325.C
326.  490  DO 500 I=1,NN
327.      J1 = J1 + 1
328.      X1(J1) = TX1(I)
329.  500  Y1(J1) = TY1(I)
330.      NT = NT + N
331.      IEL1 = IEL2 + 1
332.  510  CONTINUE
333.      WRITE(7,222) CASE,FLG15,1GEOMF(1),ISIGF(1),ICURVN,NONEWF
334.222  FORMAT(A6,511)
335.      REWIND 13
336.      IF (FLG14.LE.C) GO TO 580
337.      IF (FLG14.LE.NB) GO TO 530
338.      WRITE (6, 520 )
339.  520  FORMAT (45HVALUE OF FLG14 EXCEEDS NO. OF BODIES.  STOP. )
340.      STOP
341.  530  IF (FLG14.NE.NB) GO TO 540

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342.      NMA=0
343.      GO TO 560
344.      540 L = NR-FLG14
345.      NMA = -L
346.      DO 550 I = 1, L
347.C*** ***NMA BECOMES THE NUMBER OF ELEMENTS ON THE 1ST L BODIES (IE THOSE
348.C*** ***NOT HAVING AN INPUT VORTICITY OR VELOCITY)
349.      550 NMA = NMA + ND(I)
350.C*** ***NR BECOMES THE NUMBER OF ELEMENTS RECEIVING AN INPUT VORTICITY
351.C*** ***OR VELOCITY
352.      560 NR = NT-NMA
353.      IF (TCNST.GT.0.0) GO TO 580
354.      DO 570 I = 1,NR,6
355.      READ (5, 710 ) TG(I),TG(I+1),TG(I+2),TG(I+3),TG(I+4),TG(I+5)
356.      570 CONTINUE
357.      580 CONTINUE
358.C      * SAVE PARAMETERS
359.      WRITE (12) (X1(I),I=1,J1),(Y1(I),I=1,J1),(X2(I),I=1,NT)
360.      1      ,(Y2(I),I=1,NT),(DELL(I),I=1,NT)
361.      REWIND 12
362.C      * SAVE SINA AND COSA ON TAPE 4 FOR CALC. OF MATRIX
363.C      SOLUTION (RIGHT HAND MATRIX)
364.      WRITE (4) (SINA(I),I=1,NT),(COSA(I),I=1,NT)
365.      IF ( FLG14) 600 , 600 , 590
366.      590 IF (TCNST.GT.0.0) WRITE(4) (TCNST,I=1,NR)
367.      IF (TCNST.LC.0.) WRITE(4) (TG(I), I=1,NR)
368.      600 IF (FLG22.LC.0.) RETURN
369.      NPB1 = ND(1) - 1
370.      DO 610 I = 1,NPB1
371.      COSSQR(I) = COSA(I)**2
372.      610 RHS(I) = 2.0 * ABS( SINA(I) * COSA(I) )
373.      WRITE(4) ( COSSQR(I),I=1,NPB1), (RHS(I),I = 1,NPB1)
374.      RETURN
375.      620 FORMAT(24HCURVED ELEMENTS(IGCOMF=,I1,1H) )
376.      630 FORMAT(22HFLAT ELEMENTS(IGCOMF=,I1,1H) )
377.      640 FORMAT(1H+,30X,43HPIECEWISE-PARABOLIC SOURCE DENSITIES(ISIGF=,I1,
378.      1 1H) )
379.      650 FORMAT(1H+,30X,40HPIECEWISE-LINEAR SOURCE DENSITIES(ISIGF=,I1,1H) )
380.      660 FORMAT(1H+,30X,42HPIECEWISE-CONSTANT SOURCE DENSITIES(ISIGF=,I1,
381.      1 1H) )
382.      670 FORMAT(1H+,80X,46HINTERNALLY-COMPUTED ELEMENT CURVATURES(ICURVN=,
383.      1 I1,1H) )
384.      680 FORMAT(1H+,80X,37HUSER-INPUT ELEMENT CURVATURES(ICURVN=,I1,1H) )
385.      690 FORMAT(32H NEW VELOCITY FORMULAE ARE USED. )
386.      700 FORMAT(32H OLD VELOCITY FORMULAE ARE USED. )
387.      710 FORMAT(6E13.8)
388.      720 FORMAT( 1H1 25X 26HDOUGLAS AIRCRAFT COMPANY /
389.      1      28X 21HLONG BEACH DIVISION // 5X 10A6 //
390.      2      8X 4HNN = I4, 15X 4HMX = F13.7, 4X 4HMY = F13.7 /
391.      3      5X 7HMYTA = F13.7, 4X 6HADPX = F13.7, 2X 6HADDY =F13.7/
392.      4      8X 4HXE = F13.7, 6X 4HYE = F13.7 )
393.      730 FORMAT(1H ,6X,41H***UNTRANSFORMED*** *** TRANSFORMED ***,/1H ,
394.      1 11X,1HX,10X,1HY,10X,1HX,10X,1HY,7X,6HX C.P.,5X,6HY C.P.,5X,
395.      2 7HDELTA S,5X,5HSUMDS,5X,7HD ALPHA,3X,9HCURVATURE / )
396.      740 FORMAT(1H ,14,4F11.5)
397.      750 FORMAT(1H ,48X,6F11.5)
398.      760 FORMAT(1H0,9X,37H0 N - B O D Y C O O R D I N A T E S)

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399.	770	FORMAT(1H0,7X,39H0 F F - B O D Y C O O R D I N A T E S)	BAS13880
400.	780	FORMAT(1H0,6X,41H***UNTRANSFORMED*** *** TRANSFORMED ***,/1H ,	BAS13890
401.		1 11X,1HX,1DX,1HY,1DX,1HX,1DX,1HY,/))	BAS13900
402.	790	FORMAT(2F10.5)	BAS13910
403.	800	FORMAT(F10.5,10X,F10.5)	BAS13920
404.	810	FORMAT(1H+,55X,8A4,A3)	BAS13930
405.		END	BAS13940

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57.	NUNEC(KEC) = NUN	BAS2 570
58.	TYPEEC(KEC) = TYPE	BAS2 580
59.	40 IF (TYPE) 50 , 70 , 70	BAS2 590
60.C	* COMPUTED TYPE	BAS2 600
61.	50 DO 60 I=1,NT	BAS2 610
62.	NG(I)=Y2(I)	BAS2 620
63.	60 TG(I)=FG-X2(I)	BAS2 630
64.	GO TO 110	BAS2 640
65.C	* (X,Y) OR (N,T) TYPE * READ INPUT	BAS2 650
66.	70 DO 90 I=1,NT,6	BAS2 660
67.	READ(NIN, 80)NG(I),NG(I+1),NG(I+2),NG(I+3),NG(I+4),NG(I+5)	BAS2 670
68.	80 FORMAT (6F10.0)	BAS2 680
69.	90 CONTINUE	BAS2 690
70.	DO 100 I=1,NT,6	BAS2 700
71.	READ(NIN, 80)TG(I),TG(I+1),TG(I+2),TG(I+3),TG(I+4),TG(I+5)	BAS2 710
72.	100 CONTINUE	BAS2 720
73.	110 IF (TYPE) 120 , 140 , 120	BAS2 730
74.	120 DO 130 I = 1, NT	BAS2 740
75.	T1=NG(I)	BAS2 750
76.	NG(I)= T1*SINA(I)-TG(I)*COSA(I)	BAS2 760
77.	130 TG(I)= T1*COSA(I)+TG(I)*SINA(I)	BAS2 770
78.C	* WRITE BASIC DATA OUTPUT	BAS2 780
79.	140 WRITE (6, 150) HEDR,MSF,TYPE,FG,NUN,(NG(I),I=1,NT)	BAS2 790
80.	150 FORMAT (1H1 25X 26HDOUGLAS AIRCRAFT COMPANY /	BAS2 800
81.	1 28X, 21HLONG BEACH DIVISION /// 5X 10A6 //	BAS2 810
82.	2 6X 5HMSF = 14, 10X 6HTYPE = F10.4, 10X 4HFG = F13.7 /	BAS2 820
83.	3 1H0, 4X, 20HNON-UNIFORM FLOW NO.16 /	BAS2 830
84.	4 1H0, 4X, 10HLIST OF NG// (1H 6F14.7)	BAS2 840
85.	WRITE (6, 160) (TG(I), I = 1, NT)	BAS2 850
86.	160 FORMAT (1H0 4X 10HLIST OF TG // (1H 6F14.7))	BAS2 860
87.	WRITE (4) MSF,(NG(I),I=1,NT),(TG(I),I=1,NT)	BAS2 870
88.	170 CONTINUE	BAS2 880
89.	RETURN	BAS2 890
90.	END	BAS2 900

50.COEFF		25 AUG 75	18
1.	SUBROUTINE COEFF(J1,L)	COEF	20
2.C		COEF	10
3.C		COEF	30
4.C	THIS ROUTINE CALCULATES THE MATRIX COMBINATION CONSTANTS FOR THE	COEF	40
5.C	LINEAR-, OR QUADRATIC-SOURCE DENSITIES.	COEF	50
6.C		COEF	60
7.	COMMON /BLOCK2/ HCURV(500),HARC(500)	COEF	70
8.	COMMON /BLOCK4/A11(500),A12(500),A13(500),A21(500),A22(500),	COEF	80
9.	1A23(500)	COEF	90
10.	DIMENSION D(500),E(500),F(500),G(500),H(500),I(500),SP(500)	COEF	100
11.	EQUIVALENCE (SP(1),HARC(1))	COEF	110
12.	REAL I	COEF	120
13.C		COEF	130
14.C		COEF	140
15.C	FOR FIRST ELEMENT ...	COEF	150
16.	J2 = J1 + 1	COEF	160
17.	J3 = J2 + 1	COEF	170
18.	SUM13 = SP(J1) + SP(J3)	COEF	180
19.	SUM12 = SP(J1) + SP(J2)	COEF	190
20.	SUM23 = SP(J2) + SP(J3)	COEF	200
21.	BRAC = SP(J2) + 0.5*(SP(J1)+SP(J3))	COEF	210
22.	A = -(SUM12 + 0.5*SUM23)/(SUM12*BRAC)	COEF	220
23.	B = 2.0*(SP(J2) + 0.5*SUM13)/(SUM12*SUM23)	COEF	230
24.	C = -0.5*SUM12/(SUM23*BRAC)	COEF	240
25.C		COEF	250
26.C	FOR LAST ELEMENT ...	COEF	260
27.	LM1 = L - 1	COEF	270
28.	LM2 = L - 2	COEF	280
29.	SUM01 = SP(L) + SP(LM1)	COEF	290
30.	SUM02 = SP(L) + SP(LM2)	COEF	300
31.	SUM12 = SP(LM1) + SP(LM2)	COEF	310
32.	BRAC = SP(LM1) + 0.5*SUM02	COEF	320
33.	X = 0.5*SUM01/(SUM12*BRAC)	COEF	330
34.	Y = -2.0*BRAC/(SUM12*SUM01)	COEF	340
35.	Z = (SUM01+0.5*SUM12)/(SUM01*BRAC)	COEF	350
36.C		COEF	360
37.C	FOR THE OTHER ELEMENTS ...	COEF	370
38.	DO 10 J=J2,LM1	COEF	380
39.	JM1 = J - 1	COEF	390
40.	JP1 = J + 1	COEF	400
41.	SUM1 = SP(J) + SP(JP1)	COEF	410
42.	SUM2 = SP(J) + SP(JM1)	COEF	420
43.	BRAC = 2.0*(SP(J) + 0.5*(SP(JM1)+ SP(JP1)))	COEF	430
44.	FRAC = SUM1/SUM2	COEF	440
45.	D(J) = -FRAC/BRAC	COEF	450
46.	E(J) = (FRAC-1./FRAC)/BRAC	COEF	460
47.	F(J) = 1.0/(FRAC*BRAC)	COEF	470
48.	G(J) = 1.0/(BRAC*SUM2)	COEF	480
49.	H(J) = -1.0/(SUM2*SUM1)	COEF	490
50.	10 I(J) = 1.0/(BRAC*SUM1)	COEF	500
51.C		COEF	510
52.C	NOW, STORE THESE IN THE APPROPRIATE LOCATIONS WITHIN THE COMMON BLOCK	COEF	520
53.	A11(J1) = A	COEF	530
54.	A11(L) = X	COEF	540
55.	A12(J1) = B	COEF	550
56.	A12(L) = Y	COEF	560

57.	A13(J1) = C	COEF 570
58.	A13(L) = Z	COEF 580
59.	A21(J1) = G(J2)	COEF 590
60.	A21(L) = G(LM1)	COEF 600
61.	A22(J1) = H(J2)	COEF 610
62.	A22(L) = H(LM1)	COEF 620
63.	A23(J1) = I(J2)	COEF 630
64.	A23(L) = I(LM1)	COEF 640
65.	DO 20 J=J2,LM1	COEF 650
66.	A11(J) = D(J)	COEF 660
67.	A12(J) = E(J)	COEF 670
68.	A13(J) = F(J)	COEF 680
69.	A21(J) = G(J)	COEF 690
70.	A22(J) = H(J)	COEF 700
71.	20 A23(J) = I(J)	COEF 710
72.C		COEF 720
73.C		COEF 730
74.	RETURN	COEF 740
75.C		COEF 750
76.	END	COEF 760

Line	Code	Statement	Line	Code	Statement
50	COMBOO		25	AUG 75	18
1.		SUBROUTINE COMBO(II)		CMBO	20
2.C				CMBO	10
3.C				CMBO	30
4.		COMMON / IPSF / PSF		CMBO	40
5.		COMMON /COMBIN/CHAY(2)		CMBO	50
6.		COMMON HEOR(10), CASE, NB, NNU		CMBO	60
7.	1	,FLG03, FLG04, FLG05, FLG06, FLG07		CMBO	70
8.	2	,FLG08, FLG09, FLG10, FLG11, FLG12		CMBO	80
9.	3	,FLG13, FLG14, FLG15, FLG16, FLG17		CMBO	90
10.	4	,FLG18, FLG19, FLG20, FLG21, FLG22		CMBO	100
11.	5	,FLG23, FLG24, FLG25, FLG26, FLG27		CMBO	110
12.		COMMON NT, NOT(11), MN, NUNA(5), TYPEA(5),		CMBO	120
13.	1	NER1, NER2, NMA, NSIGA, NSIGC,		CMBO	130
14.	2	NUNC(5), TYPEC(5), NLF(11), YEC, NSIGCC,		CMBO	140
15.	3	TYPEEC(5), NUNEC(5)		CMBO	150
16.		DOUBLE PRECISION HEOR, CASE		CMBO	160
17.		INTEGER FLG03, FLG04, FLG05, FLG06, FLG07		CMBO	170
18.	1	,FLG08, FLG09, FLG10, FLG11, FLG12		CMBO	180
19.	2	,FLG13, FLG14, FLG15, FLG16, FLG17		CMBO	190
20.	3	,FLG18, FLG19, FLG20, FLG21, FLG22		CMBO	200
21.	4	,FLG23, FLG24, FLG25, FLG26, FLG27		CMBO	210
22.		REAL HN		CMBO	220
23.C				CMBO	230
24.		COMMON /C4/ X1(500), Y1(500), X2(500), Y2(500), DELS(500),		CMBO	240
25.	1	SINA(500), COSA(500), XP(500), YP(500)		CMBO	250
26.		COMMON /C/ RB(500,10), SIG(500,5), A(500), B(500),		CMBO	260
27.	1	Z(500), PHT(500,5), XN(500,5), T1(500,5),		CMBO	270
28.	2	T3(500,5), NSIG, NP, NI,		CMBO	280
29.	3	SUMV, SUMH(5)		CMBO	290
30.		DIMENSION C(2,2), DV(2), TFIRST(2,5), TLAST(2,5), TSUM(2,5)		CMBO	300
31.		DIMENSION CP(500)		CMBO	310
32.		EQUIVALENCE (CP(1), A(1))		CMBO	320
33.		EQUIVALENCE (DV(1), CHAY(1))		CMBO	330
34.		DIMENSION VX(500,5), VY(500,5), VT(500,5)		CMBO	340
35.		EQUIVALENCE (VX(1,1), XN(1,1)), (VY(1,1), T1(1,1)),		CMBO	350
36.	1	(VT(1,1), T3(1,1))		CMBO	360
37.C				CMBO	370
38.C	**	ICNT WILL BE THE NUMBER OF LIFTING RODIES		CMBO	380
39.C	*	NFLOW WILL BE THE NUMBER OF FLOWS		CMBO	390
40.C				CMBO	400
41.		ICNT = 0		CMBO	410
42.		DO 10 K=1,NB		CMBO	420
43.	10	IF(NLF(K) .LE. 0) ICNT=ICNT+1		CMBO	430
44.		NFLOW = 1 + 2*ICNT		CMBO	440
45.		IFILL .EQ. 0) GO TO 230		CMBO	450
46.		READ(5, 20) (DV(I), I=1, ICNT)		CMBO	460
47.	20	FORMAT (6F10.0)		CMBO	470
48.		WRITE(6, 30) (DV(I), I=1, ICNT)		CMBO	480
49.	30	FORMAT(1H1,42H THE INPUT DV FOR COMBINATION SOLUTION ARE /		CMBO	490
50.	1	(2X,5F10.4))		CMBO	500
51.C				CMBO	510
52.C	***	IPTCNT WILL BE THE LAST MIDPOINT ON BODY K		CMBO	520
53.C				CMBO	530
54.		IPTCNT = 0		CMBO	540
55.C	*	ILIFT WILL BE THE LIFTING BODY NUMBER		CMBO	550
56.		ILIFT = 0		CMBO	560

57.	DO 50 K=1,NB	CMBO 570
58.	IPICNT = IPTCNT + ND(K) - 1	CMBO 580
59.	IFIRST = IPTCNT - ND(K) + 2	CMBO 590
60.	IF (NLF(K) .GT. 0)GO TO 50	CMBO 600
61.	ILIFT = ILIFT + 1	CMBO 610
62.C		CMBO 620
63.	DO 40 J=1,NFLOW	CMBO 630
64.	TFIRST(ILIFT,J) = T(IFIRST,J)	CMBO 640
65.	TLAST(ILIFT,J) = T(IPICNT,J)	CMBO 650
66.	40 TSUM(ILIFT,J) = TFIRST(ILIFT,J) + TLAST(ILIFT,J)	CMBO 660
67.	50 CONTINUE	CMBO 670
68.C		CMBO 680
69.C	** IPVBD WILL BE 1ST PRESCRIBED VORTICITY FLOW	CMBO 690
70.C	* LASTSV WILL BE LAST STRIP VORTEX FLOW	CMBO 700
71.C		CMBO 710
72.	IPVBD = 2+ICNT	CMBO 720
73.	LASTSV = IPVBD - 1	CMBO 730
74.	DO 80 I=1,ICNT	CMBO 740
75.	JCNT = 0	CMBO 750
76.	DV(I) = DV(I) - TSUM(I,1)	CMBO 760
77.C		CMBO 770
78.	DO 60 J=IPVBD,NFLOW	CMBO 780
79.	60 DV(I) = DV(I) - TSUM(I,J)	CMBO 790
80.C		CMBO 800
81.	DO 70 J=2,LASTSV	CMBO 810
82.	JCNT = JCNT + 1	CMBO 820
83.	70 C(I,JCNT) = TSUM(I,J)	CMBO 830
84.	80 CONTINUE	CMBO 840
85.C		CMBO 850
86.C		CMBO 860
87.	CALL SOLCOM(DV, C, ICNT)	CMBO 870
88.	DO 110 I = 1,NT	CMBO 880
89.C	*** ADD PV FLOWS TO AXIS FLOW FOR COMBINATION SOLUTION ON BODY	CMBO 890
90.	JCNT = 0	CMBO 900
91.	DO 90 J=IPVBD,NFLOW	CMBO 910
92.	XN(I,1) = XN(I,1) + XN(I,J)	CMBO 920
93.	90 T(I,1) = T(I,1) + T(I,J)	CMBO 930
94.C	*** ADD K * STRIP VORTEX BODY VELOCITY FOR COMBINATION SOLUTION	CMBO 940
95.	DO 100 J = 2,LASTSV	CMBO 950
96.	JCNT = JCNT + 1	CMBO 960
97.	XN(I,1) = XN(I,1) + CHAY(JCNT)* XN(I,J)	CMBO 970
98.	100 T(I,1) = T(I,1) + CHAY(JCNT)*T(I,J)	CMBO 980
99.	CPI(I) = 1.0 - T(I,1)**2	CMBO 990
100.	110 CONTINUE	CMBO1000
101.	I=1	CMBO1010
102.	J=1	CMBO1020
103.	M=1	CMBO1030
104.	N=ND(M)	CMBO1040
105.	LCYR = 22	CMBO1050
106.	120 WRITE(6, 130)HEDR,CASE,PSF	CMBO1060
107.	130 FORMAT(1H1,25X, 26HDOUGLAS AIRCRAFT COMPANY /	CMBO1070
108.	1 28X, 21HLONG BEACH DIVISION ///	CMBO1080
109.	2 6X,10A6, 4X,1CHCASE NO. A6, 9H PSF = ,A4 // 1	CMBO1090
110.	WRITE(6, 140)	CMBO1100
111.	140 FORMAT(1H, 21H COMBINATION SOLUTION)	CMBO1110
112.	WRITE(6, 150)	CMBO1120
113.	150 FORMAT(1H 5X 24H TRANSFORMED COORDINATES //	CMBO1130

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114. 1 12X,1HX 13X 1HY 13X 2HY1 12X 2HCP 9X 5HSIN A 6X 5HCOS A 11W 1HN CMB01140
115. 2 // 1 CMB01150
116. 160 WRITE(6, 170 )1,X1(I),Y1(I),X2(J),Y2(J),T(J,1),CP(J),SINA(J),COSA CMB01160
117. 1J) ,XN(J,1) CMB01170
118. 170 FORMAT(1H 13,2F14.7 / 4X 4F14.7,2F11.5,F14.7 ) CMB01180
119. I=I+1 CMB01190
120. J=J+1 CMB01200
121. IF( I .EQ. N) GO TO 180 CMB01210
122. IF( I .LE. LCTR ) GO TO 160 CMB01220
123. LCTR = LCTR + 22 CMB01230
124. GO TO 120 CMB01240
125. 180 M=M+1 CMB01250
126. NEN=ND(M) CMB01260
127. WRITE(6, 190 )1,X1(I),Y1(I) CMB01270
128. 190 FORMAT( 1H 13, 2F14.7 // ) CMB01280
129. I=I+1 CMB01290
130. IF( J .LT. NT)GO TO 160 CMB01300
131. M1 = 0 CMB01310
132. N1 = 0 CMB01320
133. DO 220 K = 1,NB CMB01330
134. M1 = M1 + 1 CMB01340
135. N1 = N1 + ND(K) - 1 CMB01350
136. CIRC = 0.0 CMB01360
137. THRUST = 0.0 CMB01370
138. DO 200 I = M1,N1 CMB01380
139. CIRC = CIRC + ( Y(I,1) * DFLS(I) ) CMB01390
140. 200 THRUST = THRUST + ( Y2(I) * CP(I) * SINA(I) * DFLS(I) ) CMB01400
141. THRUST = -6.283185 * THRUST CMB01410
142. WRITE(6, 210 )K,CIRC,THRUST CMB01420
143. 210 FORMAT(///13H BODY NO. ,14,5X,14HCIRCULATION = ,F14.7,5X, CMB01430
144. 1 9HTHRUST = ,F14.7) CMB01440
145. 220 CONTINUE CMB01450
146. RETURN CMB01460
147.C *** OFF BODY COMBINATION SOLUTION CMB01470
148. 230 IPVBD = 2 + ICNT CMB01480
149. LASTSV = IPVBD - 1 CMB01490
150. DO 260 I=1,NP CMB01500
151. JCNT = 0 CMB01510
152.C *** ADD PV FLOWS TO AXIS FLOW FOR COMBINATION SOLUTION OFF BODY CMB01520
153. DO 240 J = IPVBD,NFLOW CMB01530
154. VX(I,1) = VX(I,1) + VX(I,J) CMB01540
155. 240 VY(I,1) = VY(I,1) + VY(I,J) CMB01550
156.C *** ADD K * STRIP VORTEX OFF BODY VELOCITY CMB01560
157. DO 250 J=2,LASTSV CMB01570
158. JCNT = JCNT + 1 CMB01580
159. VX(I,1) = VX(I,1) + CHAY(JCNT) * VX(I,J) CMB01590
160. 250 VY(I,1) = VY(I,1) + CHAY(JCNT) * VY(I,J) CMB01600
161. VY(I,1) = SORT( VX(I,1)**2 + VY(I,1)**2 ) CMB01610
162. 260 CONTINUE CMB01620
163. I = 1 CMB01630
164. LCTR = 45 CMB01640
165. 270 WRITE(6, 130 )HEDR,CASE,PSF CMB01650
166. WRITE(6, 280 ) CMB01660
167. 280 FORMAT(1H ,31H COMBINATION SOLUTION OFF BODY ) CMB01670
168. WRITE(6, 290 ) CMB01680
169. 290 FORMAT(1H ,5X,24H TRANSFORMED COORDINATES // CMB01690
170. 1 12X,1HX,13X,1HY,13X,2HVX,12X,2HVV,12X,2HVT //) CMB01700

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171.	300	WRITE(6, 310) I, XP(I), VP(I), VX(I,1), VY(I,1), VT(I,1)	CMB01710
172.	310	FORMAT(1H,13.5F14.7)	CMB01720
173.		I = I + 1	CMB01730
174.		IF(I .GT. NP) GO TO 320	CMB01740
175.		IF(I .LE. LCTR) GO TO 300	CMB01750
176.		LCTR = LCTR + 45	CMB01760
177.		GO TO 270	CMB01770
178.	320	CONTINUE	CMB01780
179.		RETURN	CMB01790
180.		END	CMB01800

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57.	SB=0.0	CROS 570
58.	SZ=0.0	CROS 580
59.C	* NO. OF ELEMENTS LOOP	CROS 590
60.	DO 40 J=1,NT	CROS 600
61.	SA=SA+A(J)*SIG(J,N)	CROS 610
62.	SB=SB+B(J)*SIG(J,N)	CROS 620
63.	40 SZ=SZ+Z(J)*SIG(J,N)	CROS 630
64.C	* INITIALIZE UNIFORM OR NON-UNIFORM PARAMETERS	CROS 640
65.	IF (FLG21.GT.0) GO TO 60	CROS 650
66.	IF (N.EQ.1.AND.FLG17.LE.C) GO TO 5L	CROS 660
67.	C1=RB(I,M)	CROS 670
68.	C2 = -RB(I,M-1)	CROS 680
69.	C3=0.0	CROS 690
70.	GO TO 70	CROS 700
71.	50 C1=SINA(I)	CROS 710
72.	C2=COSA(I)	CROS 720
73.	C3=1.	CROS 730
74.	GO TO 70	CROS 740
75.	60 C1 = 0.0	CROS 750
76.	C2 = 0.0	CROS 760
77.	C3 = 0.0	CROS 770
78.	70 IF (FLG12.EQ.0) GO TO 80	CROS 780
79.C	* OPTION FOR Z (PHI) MATRIX SOLUTION	CROS 790
80.	XN(I,N) = SA	CROS 800
81.	PHI(I,N) = Y2(I) * SZ	CROS 810
82.	GO TO 90	CROS 820
83.C	* REGULAR A MATRIX SOLUTION	CROS 830
84.	80 PHI(I,N)=Y2(I)*SZ	CROS 840
85.	XN(I,N)=SA+C2	CROS 850
86.	90 IF (FLG11.EQ.0) GO TO 100	CROS 860
87.C	* OPTION PERTURBATIONS	CROS 870
88.	I2(I,N)=SB	CROS 880
89.	I3(I,N)=SZ	CROS 890
90.	GO TO 110	CROS 900
91.	100 I2(I,N)=SB+C1	CROS 910
92.	I3(I,N)=SZ+C3	CROS 920
93.	110 IF(FLG21.GT.0) GO TO 120	CROS 930
94.	SUMM(N) = SUMM(N) + PHI(I,N) * Y2(I) * C2 * DELS(I)	CROS 940
95.	120 CONTINUE	CROS 950
96.	IF (FLG08.EQ.0) GO TO 160	CROS 960
97.	WRITE (6, 130) I,(A(J),J=1,NT)	CROS 970
98.	130 FORMAT (1H0 13H MATRIX A ROW I6/ (1H 10F10.5))	CROS 980
99.	WRITE (6, 140) I,(B(J),J=1,NT)	CROS 990
100.	140 FORMAT (1H0 13H MATRIX B ROW I6/ (1H 10F10.5))	CROS1000
101.	WRITE (6, 150) I,(Z(J),J=1,NT)	CROS1010
102.	150 FORMAT (1H0 13H MATRIX Z ROW I6/ (1H 10F10.5))	CROS1020
103.	160 CONTINUE	CROS1030
104.C	* PRINT CROSS FLOW (ON-BODY) OUTPUT	CROS1040
105.	DO 330 L=1,NSIG	CROS1050
106.	KC = L	CROS1060
107.	IF (FLG17.LE.0) KC=L-1	CROS1070
108.	IF(FLG21.GT.0) GO TO 170	CROS1080
109.	SUMM(L) = 3.141593 *SUMM(L)	CROS1090
110.	170 I = 1	CROS1100
111.	J=1	CROS1110
112.	M=1	CROS1120
113.	N=ND(M)	CROS1130

114.	LCTR=22	CROS1140
115.	280 WRITE(6, 190) HEDR,CASE,PSF	CROS1150
116.	190 FORMAT (1H1 25X, 26HDOUGLAS AIRCRAFT COMPANY /	CROS1160
117.	1 28X, 21HLONG BEACH DIVISION ///	CROS1170
118.	2 6X,10A6,4X,10HCASE NO. A6,10H PSF = ,A4 ///	CROS1180
119.	IF (FLG22.GT.0) GO TO 230	CROS1190
120.	IF (L.GT.1.OR.FLG17.NE.0) GO TO 210	CROS1200
121.	WRITE (6, 200)	CROS1210
122.	200 FORMAT (1H 27H ON-BODY UNIFORM CROSS FLOW)	CROS1220
123.	GO TO 250	CROS1230
124.	210 IF (TYPEC(KC).GE.0.) GO TO 230	CROS1240
125.	WRITE (6, 220)	CROS1250
126.	220 FORMAT (1H 31H FLOW GENERATOR * ROTATING BODY)	CROS1260
127.	230 WRITE (6, 240) NUNC(KC)	CROS1270
128.	240 FORMAT (1H 35H ON-BODY NON-UNIFORM CROSS FLOW NO. 18)	CROS1280
129.	250 WRITE (6, 260)	CROS1290
130.	260 FORMAT (1H 5X 24H TRANSFORMED COORDINATES //	CROS1300
131.	1 12X 1HX 13X 1HY 13X 2HT2 12X 2HT3 9X 5HSIN A	CROS1310
132.	2 6X 5HCOS A 7X 5HSIGMA 11X 1HN 13X 3HPH1 ///	CROS1320
133.	270 WRITE (6, 280) I,X1(I),Y1(I),X2(J),Y2(J), T2(J,L),T3(J,L)	CROS1330
134.	1, SINA(J),COSA(J),SIG(J,L),XN(J,L),PHI(J,L)	CROS1340
135.	280 FORMAT (1H 13,2F14.7/ 4X 4F14.7,2F11.5,3F14.7)	CROS1350
136.	I=I+1	CROS1360
137.	J=J+1	CROS1370
138.	IF (I.EQ.N) GO TO 290	CROS1380
139.	IF (I.LE.LCTR) GO TO 270	CROS1390
140.	LCTR=LCTR+22	CROS1400
141.	GO TO 180	CROS1410
142.	290 M=M+1	CROS1420
143.	N=N+NO(M)	CROS1430
144.	WRITE (6, 300) I,X1(I),Y1(I)	CROS1440
145.	300 FORMAT (1H 13, 2F14.7 ///	CROS1450
146.	I=I+1	CROS1460
147.	IF (J.GT.NT) GO TO 310	CROS1470
148.	GO TO 270	CROS1480
149.	310 IF (FLG22.GT.0) GO TO 330	CROS1490
150.	WRITE (6, 320) SUMM(L), SUMV	CROS1500
151.	320 FORMAT (1H0 10X,14H ADDED MASS = F12.7, 4X,10H VOLUME = F12.7)	CROS1510
152.	330 CONTINUE	CROS1520
153.	IF (IPUVEL.EQ.0) GO TO 340	CROS1530
154.	WRITE(6, 480)	CROS1540
155.	LOC = 6500	CROS1550
156.	CALL PUNCHV (T2, NT, NSIG, LOC, CASE)	CROS1560
157.	LOC = 6900	CROS1570
158.	CALL PUNCHV (T3, NT, NSIG, LOC, CASE)	CROS1580
159.	340 IF (FLG05.EQ.0) RETURN	CROS1590
160.C	* OFF-BODY POINT	CROS1600
161.	DO 370 I=1,NP	CROS1610
162.C	* READ MATRICES X,Y,7	CROS1620
163.	READ (10) (A(J),J=1,NT),(B(J),J=1,NT),(Z(J),J=1,NT)	CROS1630
164.C	* NO. OF FLOW	CROS1640
165.	DO 370 N=1,NSIG	CROS1650
166.	SX=0.0	CROS1660
167.	SY=0.0	CROS1670
168.	SP=0.0	CROS1680
169.C	* NO. OF ELEMENTS LOOP	CROS1690
170.	DO 350 J=1,NT	CROS1700

171.	SX=SY+AI(J)*SIG(I,J,N)	CROS1710
172.	SY=SY+BI(J)*SIG(I,J,N)	CROS1720
173.	350 SP=SP+2(I)*SIG(I,J,N)	CROS1730
174.	VX(I,N)=SX	CROS1740
175.	PHI(I,N)=YP(I)*SP	CROS1750
176.	IF (FLG22.GT.0) GO TO 360	CROS1760
177.	IF (FLG11.GT.0.OR.N.NE.1.OR.FLG17.GT.0) GO TO 360	CROS1770
178.	VY(I,N)=SY+1.	CROS1780
179.	VZ(I,N)=SP+1.	CROS1790
180.	GO TO 370	CROS1800
181.C	* PERTURBATION OR NON-UNIFORM VY,VZ	CROS1810
182.	360 VY(I,N)=SY	CROS1820
183.	VZ(I,N)=SP	CROS1830
184.	370 CONTINUE	CROS1840
185.C	* PRINT CROSS FLOW (OFF-BODY) OUTPUT	CROS1850
186.	DO 470 L=1,NSIG	CROS1860
187.	KC = L	CROS1870
188.	IF (FLG17.LE.0) KC=L-1	CROS1880
189.	I=1	CROS1890
190.	LCTR=43	
191.	380 WRITE(6, 190) IHEDR,CASE,PSF	CROS1910
192.	IF (FLG22.GT.0) GO TO 410	CROS1920
193.	IF (L.GT.1.OR.FLG17.NE.0) GO TO 400	CROS1930
194.	WRITE(6, 390)	CROS1940
195.	390 FORMAT(1H 28H OFF-BODY UNIFORM CROSS FLOW)	CROS1950
196.	GO TO 430	CROS1960
197.	400 IF (TYPEC(KC).GE.0.) GO TO 410	CROS1970
198.	WRITE(6, 220)	CROS1980
199.	410 WRITE(6, 420) NUNC(KC)	CROS1990
200.	420 FORMAT(1H 36H OFF-BODY NON-UNIFORM CROSS FLOW NO. I8)	CROS2000
201.	430 WRITE(6, 440)	CROS2010
202.	440 FORMAT(1H 5X, 24H TRANSFORMED COORDINATES //	CROS2020
203.	1 12X 1HX 13X 1HY 13X 2HVX 12X 2HVV 12X 2HVZ 12X 3HPhi //)	CROS2030
204.	450 WRITE(6, 460) I,XP(I),YP(I),VX(I,L),VY(I,L),VZ(I,L),PHI(I,L)	CROS2040
205.	460 FORMAT(1H 13, 6F14.7)	CROS2050
206.	I=I+1	CROS2060
207.	IF (I.GT.NP) GO TO 470	CROS2070
208.	IF (I.LE.LCTR) GO TO 450	CROS2080
209.	LCTR=LCTR+43	
210.	GO TO 380	CROS2100
211.	470 CONTINUE	CROS2110
212.	IF (IPUVEL.EQ.0) RETURN	CROS2120
213.	WRITE(6, 480)	CROS2130
214.	480 FORMAT(1H1,88H THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET	CROS2140
215.	1 PUNCHED WHEN THERE IS PUNCHED OUTPUT///)	CROS2150
216.	LOC = 7300	CROS2160
217.	CALL PUNCHV (VX, NP, NSIG, LOC, CASE)	CROS2170
218.	LOC = 7700	CROS2180
219.	CALL PUNCHV (VY, NP, NSIG, LOC, CASE)	CROS2190
220.	LOC = 8100	CROS2200
221.	CALL PUNCHV (VZ,NP,NSIG,LOC,CASE)	CROS2210
222.	RETURN	CROS2220
223.	END	CROS2230

50.ELINT		25 AUG 75	18
1.	SUBROUTINE ELINT3(XKSO,XN,PHI,PIE)	ELNT	20
2.C		ELNT	10
3.C	THIS SUBROUTINE CALCULATES THE INCOMPLETE ELLIPTIC INTEGRAL OF THE	ELNT	30
4.C	THIRD KIND. THE ARGUMENTS ARE:	ELNT	40
5.C	XKSO VALUE OF K SQUARED	ELNT	50
6.C	XN VALUE OF MINUS ALPHA SQUARED	ELNT	60
7.C	PHI VALUE OF PHI	ELNT	70
8.C	PIE VALUE OF INCOMPLETE ELLIPTIC INTEGRAL OF THIRD KIND	ELNT	80
9.	DATA HP /1.570796/	ELNT	90
10.	DATA ROUND /.0000050/	ELNT	100
11.	SK=XKSO	ELNT	110
12.	FN=XN	ELNT	120
13.	P=PHI	ELNT	130
14.	IF (FN.EQ.-1.0.AND.SK.EQ.1.0) GO TO 480	ELNT	140
15.	IF (SK.GT.1.) GO TO 470	ELNT	150
16.	IF (FN.LT.(-1.)) GO TO 470	ELNT	160
17.	IF (P) 10 , 470 , 20	ELNT	170
18.C	NORMALIZE PHI	ELNT	180
19.	10 A=-1.	ELNT	190
20.	P=-P	ELNT	200
21.	GOTO 30	ELNT	210
22.	20 A=1.	ELNT	220
23.	30 B=1.	ELNT	230
24.	BB=1.	ELNT	240
25.	IF (ABS(P-1.570796) .LE.10.0**(-7)) GO TO 100	ELNT	250
26.	IF (P-HP) 110 , 100 , 40	ELNT	260
27.	40 J=P/(2.*HP)	ELNT	270
28.	XX=2*J	ELNT	280
29.	P1=P-XX*HP	ELNT	290
30.	P=HP	ELNT	300
31.	B=-1.	ELNT	310
32.	GOTO 100	ELNT	320
33.	50 D=SUM	ELNT	330
34.	B=0.	ELNT	340
35.	IF (P1-HP) 60 , 70 , 80	ELNT	350
36.	60 P=P1	ELNT	360
37.	XXX=1.	ELNT	370
38.	GOTO 110	ELNT	380
39.	70 PIE=(XX+1.)*A*D	ELNT	390
40.	GOTO 460	ELNT	400
41.	80 XXX=-1.	ELNT	410
42.	XX=XX+2.	ELNT	420
43.	P=2.*HP-P1	ELNT	430
44.	GOTO 110	ELNT	440
45.	90 PIE=A*(XX*D+XXX*SUM)	ELNT	450
46.	GOTO 460	ELNT	460
47.	100 IF (SK.EQ.1.) GOTO 470	ELNT	470
48.	IF (FN.EQ.(-1.)) GO TO 470	ELNT	480
49.	110 IF (P.GT.10.E-4) GOTO 130	ELNT	490
50.	IF (FN.GT.0.) GOTO 120	ELNT	500
51.	SUM=P	ELNT	510
52.	GOTO 440	ELNT	520
53.	120 RRT=SQRT(FN)	ELNT	530
54.	SUM=ATAN(P*RRT)/RRT	ELNT	540
55.	GOTO 440	ELNT	550
56.	130 S=SIN(P)	ELNT	560

57.	S2=S**2	ELNT 570
58.	C=COS(P)	ELNT 580
59.	IF(SK.GT.0.64)GOTO 210	ELNT 590
60.	IF(ABS(FN).GE.0.6)GOTO 160	ELNT 600
61.C	POWER SERIES IN N AND K SQUARED	ELNT 610
62.	SA=1.	ELNT 620
63.	SB=SK/2.	ELNT 630
64.	CB=S*C	ELNT 640
65.	CA=P	ELNT 650
66.	FM=0.	ELNT 660
67.	SUM=P	ELNT 670
68.	X=SUM*1.E-8	ELNT 680
69. 140	SA=SB-SA*FN	ELNT 690
70.	CA=(1-CB/(2.*(FM+1.)))+(1.-.5/(FM+1.))*CA	ELNT 700
71.	Y=SA*CA	ELNT 710
72.	SUM=SUM+Y	ELNT 720
73.	IF((SR*CA).GT.X) GO TO 150	ELNT 730
74.	IF(ABS(Y).LT.X) GO TO 440	ELNT 740
75. 150	FM=FM+1.	ELNT 750
76.	CB=CB*S2	ELNT 760
77.	SB=(1.-.5/(FM+1.))*SK*SB	ELNT 770
78.	GOTO 140	ELNT 780
79.C	POWER SERIES IN K SQUARED	ELNT 790
80. 160	PX=SK	ELNT 800
81.	RT=SQRT(1.+FN)	ELNT 810
82.	IF(RT.NE.0.) GO TO 170	ELNT 820
83.	G=S/C	ELNT 830
84.	GOTO 190	ELNT 840
85. 170	IF(C.GT.4.E-3)GOTO 180	ELNT 850
86.	G=(HP-(C/(RT*S)))/RT	ELNT 860
87.	GOTO 190	ELNT 870
88. 180	G=ATAN(RT*S/C)/RT	ELNT 880
89. 190	G1=G*1.E-8	ELNT 890
90.	L=P	ELNT 900
91.	F=S*C	ELNT 910
92.	H=1.	ELNT 920
93.	SUM=G	ELNT 930
94.	FM=0.	ELNT 940
95. 200	G=(E-G)/FN	ELNT 950
96.	H=H*(1.-0.5/(FM+1.))	ELNT 960
97.	G2=H*G*PK	ELNT 970
98.	SUM=SUM+G2	ELNT 980
99.	IF(G2.LE.G1)GOTO 440	ELNT 990
100.	FM=FM+1.	ELNT 1000
101.	E=-F/(2.*FM)+(1.-0.5/FM)*E	ELNT 1010
102.	F=F*S2	ELNT 1020
103.	PK=PK*SK	ELNT 1030
104.	GOTO 200	ELNT 1040
105. 210	SKP=1.-SK	ELNT 1050
106.	IF(S.LT.C) GO TO 320	ELNT 1060
107.C	ADDITION FORMULA	ELNT 1070
108.	ZP=SQRT(1.-SK*S2)	ELNT 1080
109.	RT1=SQRT(ABS(FN*(FN+1.)*(FN+SK)))	ELNT 1090
110.	SST=(1.-ZP)/(SK*(C+1.))	ELNT 1100
111.	XP=(SST*S*RT1)/(1.+FN*S2-FN*SST*C*ZP)	ELNT 1110
112.	IF(FN.220, 290, 250	ELNT 1120
113. 220	IF(RT1.NE.0.) GO TO 240	ELNT 1130

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114.		R=S/(C+1.)	ELNT1140
115.		IF(FN.NC.(-1.)) GO TO 230	ELNT1150
116.		CF=(2.*R-SK*SST*S-(S/C)*ZP)/SKP	ELNT1160
117.		GOTO 300	ELNT1170
118.	230	CF=(SST*(S-(2./R))+S*C/ZP)*(SK/SKP)	ELNT1180
119.		GOTO 300	ELNT1190
120.	240	IF(FN*(FN+SK).LT.D.) GO TO 260	ELNT1200
121.	250	CF=(FN/RT1)*ATAN(XP)	ELNT1210
122.		GOTO 300	ELNT1220
123.	260	IF(ABS(XP).GE.D.) GOTO 270	ELNT1230
124.		YX=XP**2	ELNT1240
125.		YX=2.*XP*(1.+YX*(1./3.+YX*(1.2+YX/7.)))	ELNT1250
126.		GOTO 280	ELNT1260
127.	270	YX=ALOG((1.+XP)/(1.-XP))	ELNT1270
128.	280	CF=(FN*YX)/(2.*RT1)	ELNT1280
129.		GOTO 300	ELNT1290
130.	290	CF=0.	ELNT1300
131.	300	BB=-1.	ELNT1310
132.		S=SQRT(SST)	ELNT1320
133.		C=SQRT(1.-SST)	ELNT1330
134.		GOTO 320	ELNT1340
135.	310	SUM=2.*SUM-CF	ELNT1350
136.		GOTO 440	ELNT1360
137.	320	U=S/C	ELNT1370
138.		V=1./C	ELNT1380
139.		T=U*V	ELNT1390
140.		W=U**2	ELNT1400
141.		IF(S.GT.D.) GOTO 330	ELNT1410
142.		R=S*(1.+S2*(1./3.+S2*(1.2+S2/7.)))	ELNT1420
143.		GOTO 340	ELNT1430
144.	330	R=ALOG(U+V)	ELNT1440
145.	340	D=1.+FN	ELNT1450
146.		IF(D.GT.SK) GOTO 360	ELNT1460
147.C		POWER SERIES IN 1+N AND 1 - (K SQUARED)	ELNT1470
148.		CA=1.	ELNT1480
149.		CB=-0.5*SKP	ELNT1490
150.		AL=(T+R)/2.	ELNT1500
151.		BC=U*V**3	ELNT1510
152.		FM=0.	ELNT1520
153.		SUM=AL	ELNT1530
154.		T1=SUM*1.E-8	ELNT1540
155.	350	CA=-D*CA+CB	ELNT1550
156.		AL=(BC-(2.*FM+1.)*AL)/(2.*(FM+2.))	ELNT1560
157.		X=CA*AL	ELNT1570
158.		SUM=SUM+X	ELNT1580
159.		IF(ABS(X).LT.T1) GOTO 430	ELNT1590
160.		FM=FM+1.	ELNT1600
161.		CB=-((2.*FM+1.)/(2.*(FM+1.)))*CB*SKP	ELNT1610
162.		IF(ABS(BE).LT.10.E-30) BE=D.	ELNT1620
163.		BE=BE*W	ELNT1630
164.		GOTO 350	ELNT1640
165.C		POWER SERIES IN 1 - (K SQUARED)	ELNT1650
166.	360	RT=SQRT(ABS(FN))	ELNT1660
167.		IF(FN) 370 , 380 , 390	ELNT1670
168.	370	Q=ALOG((1.+RT*S)/(1.-RT*S))/(2.*RT)	ELNT1680
169.		GOTO 400	ELNT1690
170.	380	Q=S	ELNT1700

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171.	GOTO 400	ELNT1710
172.	390 Q=ATAN(RT*S)/RT	ELNT1720
173.	400 SUM=FN*Q*R	ELNT1730
174.	PKP=SKP	ELNT1740
175.	AP=-0.5	ELNT1750
176.	FM=1.	ELNT1760
177.	T1=SUM*1.E-8	ELNT1770
178.	410 Q=(R-Q)/D	ELNT1780
179.	R=T/(2.*FM)-(1.-.5/FM)*R	ELNT1790
180.	X=AP*(FN*Q+R)*PKP	ELNT1800
181.	SUM=SUM+X	ELNT1810
182.	IF(ABS(X).LT.T1)GOTO 420	ELNT1820
183.	T=T+M	ELNT1830
184.	PKP=PKP*SKP	ELNT1840
185.	FM=FM+1.	ELNT1850
186.	AP=-AP*(1.-.5/FM)	ELNT1860
187.	GOTO 410	ELNT1870
188.	420 SUM=SUM/D	ELNT1880
189.	430 IF(88.LT.0.)GOTO 310	ELNT1890
190.	440 IF(B) 50 , 90 , 450	ELNT1900
191.	450 PIE=A*SUM	ELNT1910
192.	460 PIE=PIE+PIE*ROUND	ELNT1920
193.	RETURN	ELNT1930
194.C	ERROR RETURN	ELNT1940
195.	470 PIE=0.	ELNT1950
196.	GOTO 460	ELNT1960
197.C	CASE OF PI(1,1,PHI)	ELNT1970
198.	480 PIE = 0.5*(TAN(P)/COS(P)+ALOG(TAN((HP+P)/2.0)))	ELNT1980
199.	GO TO 460	ELNT1990
200.	END	ELNT2000

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50.ELIP								25 AUG 75	18
1.		SUBROUTINE ELIP							ELIP 20
2.C									ELIP 10
3.C									ELIP 30
4.C									ELIP 40
5.C									ELIP 50
6.		COMMON	HEDR(10)	CASE	NB	NNU			ELIP 60
7.	1		,FLG03	,FLG04	,FLG05	,FLG06	,FLG07		ELIP 70
8.	2		,FLG08	,FLG09	,FLG10	,FLG11	,FLG12		ELIP 80
9.	3		,FLG13	,FLG14	,FLG15	,FLG16	,FLG17		ELIP 90
10.	4		,FLG18	,FLG19	,FLG20	,FLG21	,FLG22		ELIP 100
11.	5		,FLG23	,FLG24	,FLG25	,FLG26	,FLG27		ELIP 110
12.		COMMON	NT,	ND(11),	MN,	NUNA(5),	TYPEA(5),		ELIP 120
13.	1		NER1,	NER2,	NMA,	NSIGA,	NSIGC,		ELIP 130
14.	2		NUNC(5),	TYPEC(5),	NLF(11),	IEC,	NSIGEC,		ELIP 140
15.	3		TYPEEC(5),	NUNEC(5)					ELIP 150
16.		DOUBLE PRECISION	HEDR, CASE						ELIP 160
17.		INTEGER	FLG03	,FLG04	,FLG05	,FLG06	,FLG07		ELIP 170
18.	1		,FLG08	,FLG09	,FLG10	,FLG11	,FLG12		ELIP 180
19.	2		,FLG13	,FLG14	,FLG15	,FLG16	,FLG17		ELIP 190
20.	3		,FLG18	,FLG19	,FLG20	,FLG21	,FLG22		ELIP 200
21.	4		,FLG23	,FLG24	,FLG25	,FLG26	,FLG27		ELIP 210
22.		REAL	MN						ELIP 220
23.		LOGICAL PF							ELIP 230
24.C									ELIP 240
25.		COMMON /CL/	X1(500),	Y1(500),	X2(500),	Y2(500),	DELL(500),		ELIP 250
26.	1		SINA(500),	COSA(500),	XP(500),	YP(500)			ELIP 260
27.	2		,XWAKE(11),	YWAKE(11)					ELIP 270
28.		COMMON /TL/	A(500),	B(500),	AX(500),	AY(500),	AZ(500),		ELIP 280
29.	1		CX(500),	CY(500),	CZ(500),	AXV(500),	AYV(500),		ELIP 290
30.	2		VN(500,5),	VT(500,5),	BON,	IAC,			ELIP 300
31.	3		I,	J,	J1,	SJ,	DS,		ELIP 310
32.	4		OX,	OY,	NI,	XJ,	YJ,		ELIP 320
33.	5		XK,	EK,	EKK,	K,	PF		ELIP 330
34.C									ELIP 340
35.C									ELIP 350
36.			ETA = 1. - XK						ELIP 360
37.			IF (ETA) 10 , 10 , 40						ELIP 370
38.	10		IF (BON .GT. 0.5) GO TO 20						ELIP 380
39.			XI = X2(1)						ELIP 390
40.			YI = Y2(1)						ELIP 400
41.			GO TO 30						ELIP 410
42.	20		XI = XP(1)						ELIP 420
43.			YI = YP(1)						ELIP 430
44.	30		WRITE (6, 50) I,XI,YI,J,XJ,YJ,XK,ETA						ELIP 440
45.			ETA = 0.000005						ELIP 450
46.	40		ELN=ALOG(ETA)						ELIP 460
47.			EKK = 1.386294E0	+ ETA * (.9666344E-1	+ ETA *				ELIP 470
48.	1		(.3590092E-1	+ ETA * (.3742564E-1	+ ETA *				ELIP 480
49.	2		.1451196E-1	))) - ELN * (.5 + ETA * (.1249859E0					ELIP 490
50.	3		ETA * (.6883249E-1	+ ETA * (.3328355E-1	+ ETA *				ELIP 500
51.	4		.4417870E-2	))))					ELIP 510
52.			EKK = 1. + ETA * (.4432514E0	+ ETA * (.6260601E-1	+ ETA *				ELIP 520
53.	1		(.4757384E-1	+ ETA * (.1736506E-1	))) - ELN * (ETA *				ELIP 530
54.	2		(.2499837E0	+ ETA * (.9200180E-1	+ ETA *				ELIP 540
55.	3		(.4069698E-1	+ ETA * (.5264496E-2	))))				ELIP 550
56.			RETURN						ELIP 560

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57.C          ELIP 570
58. 50 FORMAT(' ERROR IN CLIP. I=',I3,', XI=',F10.5,', YI=',F10.5, ELIP 580
59. 1', J=',I3,', XJ=',F10.5,', YJ=',F10.5,', XK=',F8.5,', ETA=',F8.5)ELIP 590
60.      END          ELIP 600
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50.ELLCC
1. SUBROUTINE ELLC (A,K,E,J)
2.C
3.C THIS SUBROUTINE CALCULATES THE ASSOCIATED COMPLETE ELLIPTIC INTEGRALS
4.C OF THE FIRST OR SECOND KIND
5.C THE ARGUMENTS ARE
6.C A ARGUMENT (K SQUARED) FOR WHICH E* OR K* WILL BE FOUND
7.C K VALUE OF ASSOCIATED COMPLETE ELLIPTIC INTEGRAL OF FIRST KIND
8.C E VALUE OF ASSOCIATED COMPLETE ELLIPTIC INTEGRAL OF SECOND KIND
9.C I IF EQ 1, COMPUTE K ; IF EQ 2, COMPUTE E
10. DOUBLE PRECISION K,E,CON(32),A,LN4,CF(29),CL(3),DLOG
11. EQUIVALENCE (CON(1),CF(1)), (CON(30),CL(1))
12. DATA CF /9.6573590797589018D-2,3.0885573486752694D-2,1.4978988178
13. 1704629D-2,9.6587579861753113D-3,1.1208918554644092D-2,1.3855601247
14. 215656D-2,6.6905509906897936D-3,6.499844332939D18D-4,1.249999999411
15. 37923D-1,7.0312426464627361D-2,4.8818C58565403952D-2,3.706839873415
16. 45422D-2,2.718986111678825D-2,1.4105380776158048D-2,3.1831309927862
17. 5886D-3,1.5049181783601883D-4,4.4314718112155806D-1,5.6805657874695
18. 6358D-2,2.1876220647186198D-2,1.2510592410844644D-2,1.3034146073731
19. 7432D-2,1.5377102528552019D-2,7.3356164974290365D-3,7.0980964089987
20. 8229D-4,2.49999999993617622D-1,9.3749920249680113D-2,5.8582839536559
21. 9024D-2,4.23828074569479D-2,3.0302747728412848D-2 /
22. DATA CL / 1.5525129948040721D-2,3.4838679435876492D-3,1.642721079
23. 17048025D-4 /
24. LN4 = 1.386294361119890D
25. IF (A.EQ.C.D) GO TO 40
26. GO TO ( 10 , 20 ),I
27. 10 K = LN4 + ((((((CON(8)*A+CON(7))*A+CON(6))*A+CON(5))*A+CON(4))*A
28. 1+ CON(3))*A+CON(2))*A+CON(1))*A - DLOG(A)*(((((CON(16)*A+
29. 2CON(15))*A+CON(14))*A+CON(13))*A+CON(12))*A+CON(11))*A+CON(10))*A
30. 3+ CON(9))*A)
31. GO TO 30
32. 20 E = 1.000+(((((((CON(24)*A+CON(23))*A+CON(22)
33. 1))*A+CON(19))*A+CON(18))*A+CON(17))*A - DLOG(A)*((((CON(32)*A
34. 2+ CON(31))*A+CON(30))*A+CON(29))*A+CON(28))*A+CON(27))*A+CON(26))*A
35. 3A+CON(25))*A)
36. 30 RETURN
37. 40 K = 0.999999999D36
38. E = 1.000
39. RETURN
40. END

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25 AUG 75 18

ELLCC 20

ELLCC 10

ELLCC 30

ELLCC 40

ELLCC 50

ELLCC 60

ELLCC 70

ELLCC 80

ELLCC 90

ELLCC 100

ELLCC 110

ELLCC 120

ELLCC 130

ELLCC 140

ELLCC 150

ELLCC 160

ELLCC 170

ELLCC 180

ELLCC 190

ELLCC 200

ELLCC 210

ELLCC 220

ELLCC 230

ELLCC 240

ELLCC 250

ELLCC 260

ELLCC 270

ELLCC 280

ELLCC 290

ELLCC 300

ELLCC 310

ELLCC 320

ELLCC 330

ELLCC 340

ELLCC 350

ELLCC 360

ELLCC 370

ELLCC 380

ELLCC 390

ELLCC 400

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50.	EXCR								25 AUG 75	18
1.		SUBROUTINE EXCROS							EXCR	20
2.	C								EXCR	10
3.	C***	***COMPUTE EXTRA CROSS FLOW VELOCITY COMPONENTS AND PRINT							EXCR	30
4.		COMMON /IPSF/ PSF							EXCR	40
5.		COMMON	HEDR(10)	,CASE	,NB	,NNU			EXCR	50
6.	1		,FLG03	,FLG04	,FLG05	,FLG06	,FLG07		EXCR	60
7.	2		,FLG08	,FLG09	,FLG10	,FLG11	,FLG12		EXCR	70
8.	3		,FLG13	,FLG14	,FLG15	,FLG16	,FLG17		EXCR	80
9.	4		,FLG18	,FLG19	,FLG20	,FLG21	,FLG22		EXCR	90
10.	5		,FLG23	,FLG24	,FLG25	,FLG26	,FLG27		EXCR	100
11.		COMMON	NT,	ND(11),	MN,	NUNA(5),	TYPEA(5),		EXCR	110
12.	1		NER1,	HLR2,	NMA,	NSIGA,	NSIGC,		EXCR	120
13.	2		NUNC(5),	TYPEC(5),	NLF(11),	IEC,	NSIGEC,		EXCR	130
14.	3		TYPEEC(5),NUNEC(5)						EXCR	140
15.		DOUBLE PRECISION	HEDR,	CASE					EXCR	150
16.		INTEGER	FLG03	,FLG04	,FLG05	,FLG06	,FLG07		EXCR	160
17.	1		,FLG08	,FLG09	,FLG10	,FLG11	,FLG12		EXCR	170
18.	2		,FLG13	,FLG14	,FLG15	,FLG16	,FLG17		EXCR	180
19.	3		,FLG18	,FLG19	,FLG20	,FLG21	,FLG22		EXCR	190
20.	4		,FLG23	,FLG24	,FLG25	,FLG26	,FLG27		EXCR	200
21.		COMMON /P/	IPUVEL						EXCR	210
22.		REAL	MN						EXCR	220
23.	C								EXCR	230
24.		COMMON /C4/	X1(500),	Y1(500),	X2(500),	Y2(500),	DELS(500),		EXCR	240
25.	1		SINA(500),	COSA(500),	XP(500),	YP(500)			EXCR	250
26.		COMMON /TC/	RB(500,10),	SIG(500,5),	A(500),	B(500),			EXCR	260
27.	1		Z(500),	PHI(500,5),	XN(500,5),	T(500,5),			EXCR	270
28.	2		T3(500,5),	NSIG,	NP,	NI,			EXCR	280
29.	3		SUMV,	SUMH(5)					EXCR	290
30.	C								EXCR	300
31.		DIMENSION VX(500,5),VY(500,5),VZ(500,5),T2(500,5)							EXCR	310
32.	C								EXCR	320
33.		EQUIVALENCE (VX(1,1), XN(1,1)), (VY(1,1), T(1,1)),							EXCR	330
34.	1	(VZ(1,1), T3(1,1)), (T2(1,1), T(1,1))							EXCR	340
35.	C								EXCR	350
36.		REWIND 8							EXCR	360
37.		IF (FLG08.EQ.0) GO TO 20							EXCR	370
38.	C***	***TITLE FOR MATRIX PRINT							EXCR	380
39.		WRITE(6, 110) HEDR,CASE,PSF							EXCR	390
40.		WRITE(6, 10)							EXCR	400
41.	10	FORMAT (1H 42H MATRICES A,B,Z BY ROWS * EXTRA CROSS FLOW //)							EXCR	410
42.	C***	***READ EXTRA CROSS SIGMAS							EXCR	420
43.	20	DO 30 N = 1,NSIG							EXCR	430
44.	30	READ (3) (SIG(I,N),I = 1,NT)							EXCR	440
45.	C***	***NO. OF MIDPOINTS LOOP							EXCR	450
46.		DO 90 I = 1,NT							EXCR	460
47.	C***	***READ MATRICES A,B,Z							EXCR	470
48.	C***	***YOU MUST SOLVE POTENTIAL MATRIX FOR EXCROS							EXCR	480
49.		READ (8) (A(J),J = 1,NT),(B (J),J = 1,NT), (Z(J),J = 1,NT)							EXCR	490
50.	C***	***NO. OF FLOWS LOOP							EXCR	500
51.		M = 0							EXCR	510
52.		DO 50 N = 1,NSIG							EXCR	520
53.		M = M + 2							EXCR	530
54.		SA = 0.0							EXCR	540
55.		SB = 0.0							EXCR	550
56.		SZ = 0.0							EXCR	560

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114.	IF (J.GE.NT) GO TO 210	EXCR1140
115.	GO TO 170	EXCR1150
116.	210 CONTINUE	EXCR1160
117.C***	***THIS IS WHERE THE CALL FOR PUNCHED OUTPUT WILL GO	EXCR1170
118.	IF (FLG05.EQ.0) RETURN	EXCR1180
119.C***	***OFF BODY POINTS	EXCR1190
120.	DO 230 I = 1,NP	EXCR1200
121.C***	***READ MATRICES X,Y,Z	EXCR1210
122.	READ (8) (A(I),J=1,NT),(B(I),J = 1,NT), (Z(I),J = 1,NT)	EXCR1220
123.	DO 230 N = 1,NSIG	EXCR1230
124.	SX = 0.0	EXCR1240
125.	SY = 0.0	EXCR1250
126.	SP = 0.0	EXCR1260
127.C***	***NUMBER OF ELEMENTS LOOP	EXCR1270
128.	DO 220 J = 1,NT	EXCR1280
129.	SX = SX + A(J) * SIG (J,N)	EXCR1290
130.	SY = SY + B(J) * SIG (J,N)	EXCR1300
131.	220 SP = SP + Z(J) * SIG(J,N)	EXCR1310
132.	VX(I,N) = SX	EXCR1320
133.	VY(I,N) = SY	EXCR1330
134.	VZ(I,N) = SP	EXCR1340
135.	PHI(I,N) = YP(I) * SP / 2.0	EXCR1350
136.	230 CONTINUE	EXCR1360
137.C***	***PRINT EXTRA CROSS FLOW (OFF-BODY) OUTPUT	EXCR1370
138.	DO 320 L = 1,NSIG	EXCR1380
139.	KCC = L	EXCR1390
140.	I = 1	EXCR1400
141.	LCTR = 45	EXCR1410
142.	240 WRITE(6, 110) HEDR,CASE,PSF	EXCR1420
143.	IF (FLG22.GT.0) GO TO 260	EXCR1430
144.	WRITE(6, 250) NUNEC(KCC)	EXCR1440
145.	250 FORMAT (43H OFF BODY NON-UNIFORM EXTRA CROSS FLOW NO. 18)	EXCR1450
146.	GO TO 260	EXCR1460
147.	260 WRITE(6, 270)	EXCR1470
148.	270 FORMAT(68H OFF BODY GENERATED (RESEP) BOUNDARY CONDITIONS	EXCR1480
149.	1A CROSS FLOW)	EXCR1490
150.	280 WRITE (6, 290)	EXCR1500
151.	290 FORMAT (1H 5X, 24H TRANSFORMED COORDINATES //	EXCR1510
152.	1 12X 1HX 13X 1HY 13X 2HVX 12X 2HVV 12X 2HVZ 12X 3MPHI //)	EXCR1520
153.	300 WRITE (, 310) I,XP(I),YP(I),VX(I,L),VY(I,L),VZ(I,L),PHI(I,L)	EXCR1530
154.	310 FORMAT (1H 13, 6F14.7)	EXCR1540
155.	I = I + 1	EXCR1550
156.	IF (I.GT.NP) GO TO 320	EXCR1560
157.	IF (I.LE.LCTR) GO TO 300	EXCR1570
158.	LCTR = LCTR + 45	EXCR1580
159.	GO TO 240	EXCR1590
160.	320 CONTINUE	EXCR1600
161.C***	***THIS IS WHERE THE CALL TO PUNCHED OUTPUT OFF BODY WILL GO	EXCR1610
162.	RETURN	EXCR1620
163.	END	EXCR1630

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SO.HLAMB		25 AUG 75	18
1.	FUNCTION HLAMB (BETA,K)	HLAM	20
2.C		HLAM	30
3.C	THIS SUBROUTINE CALCULATES THE HEUMAN'S LAMBDA FUNCTION OF BETA AND KHLAM	HLAM	40
4.	DOUBLE PRECISION A,F,E	HLAM	50
5.	REAL K	HLAM	60
6.	DATA TWOP/0.6366197724/	HLAM	70
7.	CALL INEL (FI,EI,PI,BETA,BETA,1.0-K**2 ,0,1,1)	HLAM	80
8.	A = 1.0 - K **2	HLAM	90
9.	CALL ELLC (A ,F,E,1)	HLAM	100
10.	CALL ELLC (A ,F,E,2)	HLAM	110
11.	HLAMB = TWOP*(F*EI + (E-F)*FI)	HLAM	120
12.	RETURN	HLAM	130
13.	END		

50.	INNEL		25 AUG 75	18
1.		SUBROUTINE INEL (F,E,PI,A,PHI,SKI,K3,K2,K1).	INEL	20
2.C			INEL	10
3.C		THIS SUBROUTINE CALCULATES THE INCOMPLETE ELLIPTIC INTEGRALS OF THE	INEL	30
4.C		FIRST, SECOND AND THRD KINDS. THE ARGUMENTS ARE:	INEL	40
5.C	F	VALUE OF INCOMPLETE ELLIPTIC INTEGRAL OF THE FIRST KIND	INEL	50
6.C	E	VALUE OF INCOMPLETE ELLIPTIC INTEGRAL OF THE SECOND KIND	INEL	60
7.C	PI	VALUE OF INCOMPLETE ELLIPTIC INTEGRAL OF THE THIRD KIND	INEL	70
8.C	A	VALUE OF ALPHA SQUARED	INEL	80
9.C	PHI	VALUE OF PHI	INEL	90
10.C	SKI	VALUE OF K SQUARED	INEL	100
11.C	K3	IF EQ 0, DO NOT COMPUTE PI ; IF NE 0, COMPUTE PI	INEL	110
12.C	K2	IF EQ 0, DO NOT COMPUTE E ; IF NE 0, COMPUTE E	INEL	120
13.C	K1	IF EQ 0, DO NOT COMPUTE F ; IF NE 0, COMPUTE F	INEL	130
14.		DOUBLE PRECISION ARG,FD,ED	INEL	140
15.		DATA PI/1.57079633/	INEL	150
16.		E=0.0	INEL	160
17.		F=0.0	INEL	170
18.		IF (K3.EQ.0) GO TO 10	INEL	180
19.		CALL ELINT3 (SKI,-A,PHI,PI)	INEL	190
20.	10	IF (K1.EQ.0) GO TO 30	INEL	200
21.		IF (ABS(PHI-PI).GT.10.0**(-7)) GO TO 20	INEL	210
22.		ARG=1.0-SKI	INEL	220
23.		CALL ELLC (ARG,FD,ED,1)	INEL	230
24.		F=FD	INEL	240
25.		GO TO 30	INEL	250
26.	20	CALL ELINT3 (SKI,0.0,PHI,F)	INEL	260
27.	30	IF (K2.EQ.0) GO TO 50	INEL	270
28.		IF (ABS(PHI-PI).GT.10.0**(-7)) GO TO 40	INEL	280
29.		ARG=1.0-SKI	INEL	290
30.		CALL ELLC (ARG,FD,ED,2)	INEL	300
31.		E=ED	INEL	310
32.		GO TO 50	INEL	320
33.	40	CALL ELINT3 (SKI,-SKI,PHI,E)	INEL	330
34.		E=(1.0-SKI)*E+0.5*SKI*SIN(2.0*PHI)/SQRT(1.0-SKI*SIN(PHI)**2)	INEL	340
35.	50	RETURN	INEL	350
36.		END	INEL	360

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50. IRAKES	25 AUG 75	18
1. SUBROUTINE IRAKES(X,Y,NN)	IRAK	20
2.C	IRAK	10
3.C THIS ROUTINE READS IN MASS-FLOW RAKE TYPE INPUT AND CALCULATES THE	IRAK	30
4.C POINT SPACING, OFF-BODY POINT LOCATIONS, RAKE UNIT NORMAL VECTORS,	IRAK	40
5.C AND AREAS, AND IDENTIFIER STORAGES.	IRAK	50
6. COMMON /BLOCKR/ NRAKES,RNAME(20,9),RAKEA(20),RUNITX(20),	IRAK	60
7. 1 RUNITY(20),RDS(20),NRPTS(20),COSTH(20),IRAKF,NOFF,X1R(20),	IRAK	70
8. 2 Y1R(20),X2R(20),Y2R(20)	IRAK	80
9. DIMENSION X(1),Y(1)	IRAK	90
10. DATA PI/3.1415927/	IRAK	100
11.C	IRAK	110
12. NN = 0	IRAK	120
13.C	IRAK	130
14.C	IRAK	140
15. DO 40 IRAKE=1,NRAKES	IRAK	150
16. READ (5, 50) X1,Y1,X2,Y2,N,(RNAME(IRAKE,I),I=1,9)	IRAK	160
17. X1R(IRAKE) = X1	IRAK	170
18. Y1R(IRAKE) = Y1	IRAK	180
19. X2R(IRAKE) = X2	IRAK	190
20. Y2R(IRAKE) = Y2	IRAK	200
21. IF (N .GE. 4) GO TO 10	IRAK	210
22. WRITE (6, 60) N	IRAK	220
23. N = 4	IRAK	230
24. GO TO 20	IRAK	240
25.C	IRAK	250
26. 10 ND = N	IRAK	260
27. N = (N/2)*2	IRAK	270
28. IF (N .EQ. ND) GO TO 20	IRAK	280
29. WRITE (6, 70) ND,N	IRAK	290
30.C	IRAK	300
31. 20 DX = X2 - X1	IRAK	310
32. DY = Y2 - Y1	IRAK	320
33. D = SQRT(DX**2 + DY**2)	IRAK	330
34. UX = DX/D	IRAK	340
35. UY = DY/D	IRAK	350
36. COSTH(IRAKE) = UY	IRAK	360
37.C CONSTRUCT UNIT NORMAL TO THIS RAKE ...	IRAK	370
38. RUNITX(IRAKE) = UY	IRAK	380
39. RUNITY(IRAKE) = -UX	IRAK	390
40.C CALCULATE RAKE AREA ...	IRAK	400
41. RAKEA(IRAKE) = PI*D*(Y1+Y2)	IRAK	410
42.C	IRAK	420
43.C THE NUMBER OF NEEDED OFF-BODY POINTS IS 1 LESS THAN THE NUMBER OF	IRAK	430
44.C INTERVALS (THE ACTUAL VALUES AT BOTH ENDS WILL BE OBTAINED BY	IRAK	440
45.C EXTRAPOLATION) ...	IRAK	450
46. FN = N	IRAK	460
47. RDS(IRAKE) = D/FN	IRAK	470
48. DX = DX/FN	IRAK	480
49. DY = DY/FN	IRAK	490
50. M = N - 1	IRAK	500
51. NRPTS(IRAKE) = M	IRAK	510
52. DO 30 I=1,M	IRAK	520
53. NN = NN + 1	IRAK	530
54. FI = I	IRAK	540
55. X(NN) = X1 + FI*DX	IRAK	550
56. 30 Y(NN) = Y1 + FI*DY	IRAK	560

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57.C		IRAK	570
58.C		IRAK	580
59.C	TEMPORARY WRITE ...	IRAK	590
60.CCC	WRITE (6,2) IRAKE,X1,Y1,X2,Y2,N,(RNAME(IRAKE,I),I=1,9)	IRAK	600
61.CCC	M1 = NN - M + 1	IRAK	610
62.CCC	WRITE (6,3) (X(J),Y(J),J=M1,NN)	IRAK	620
63.CCC	WRITE (6,4) RUNITX(IRAKE),RUNITY(IRAKE),RAKEA(IRAKE),RDS(IRAKE)	IRAK	630
64.C		IRAK	640
65.	40 CONTINUE	IRAK	650
66.	RETURN	IRAK	660
67.C		IRAK	670
68.	50 FORMAT(4F10.5,I5,8A4,A3)	IRAK	680
69.	60 FORMAT('INPUT ERROR FOR FLOW RAKE NUMBER',I3,'.',/10X,'ATTEMPT TO	IRAK	690
70.	1 USE FEWER THAN 4 INTERVALS. PROGRAM HAS RESET N=4.')	IRAK	700
71.	70 FORMAT('INPUT ERROR FOR FLOW RAKE NUMBER',I3,'.',/10X,'ATTEMPT TO	IRAK	710
72.	1 USE AN ODD NUMBER OF INTERVALS (N=',I3,')',/10X,'PROGRAM HAS RE	IRAK	720
73.	2SET N=',I3,')	IRAK	730
74.	END	IRAK	740

50.MATX		08 DEC 75 14	
1.	SUBROUTINE MATRIX		MTRX 20
2.C			MTRX 10
3.C			MTRX 30
4.C	* COMPUTE MATRIX A,B,Z OR X,Y,Z		MTRX 40
5.C			MTRX 50
6.	COMMON /BLOCK1/ IGEOMF(9),ISTGF(9),IPNCHF,NONEW(9)		MTRX 60
7.	COMMON /BLOCK3/NOAXI,NOCROS,NOVORT,NOV1,NOV2,FIRSTE,LASTE,LSSE,SD		MTRX 70
8.	1 NSMALL		MTRX 80
9.	COMMON /BLOCK4/A11(500),A12(500),A13(500),A21(500),A22(500),		MTRX 90
10.	A23(500)		MTRX 100
11.	COMMON /PRINT/ PRIN1,PRIN2,PRIN3		MTRX 110
12.	LOGICAL PRIN1,PRIN2,PRIN3		MTRX 120
13.	COMMON HEOR(10),CASE,NB,NNU		MTRX 130
14.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		MTRX 140
15.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		MTRX 150
16.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		MTRX 160
17.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		MTRX 170
18.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		MTRX 180
19.	COMMON NT,ND(11),MN,NUNA(5),TYPEA(5),		MTRX 190
20.	1 NER1,NER2,NMA,NSIGA,NSIGC,		MTRX 200
21.	2 NUNC(5),TYPEC(5),NLF(11),IEC,NSIGEC,		MTRX 210
22.	3 TYPEEC(5),NUNEC(5)		MTRX 220
23.	DOUBLE PRECISION HEOR,CASE		MTRX 230
24.	INTEGER ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		MTRX 240
25.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		MTRX 250
26.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		MTRX 260
27.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		MTRX 270
28.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		MTRX 280
29.	REAL MN		MTRX 290
30.	LOGICAL NONEW,OLDIES,PF		MTRX 300
31.	LOGICAL NOAXI,NOCROS,NOVORT,NOV1,NOV2,FIRSTE,LASTE		MTRX 310
32.	REAL LSSE		MTRX 320
33.C			MTRX 330
34.	COMMON /ECF/ ECX(500),ECY(500),ECZ(500)		MTRX 340
35.	COMMON /RNGWNG/ VA(500,2),VR(500,2),VAN(500),VAT(500)		MTRX 350
36.	COMMON /CL/ X1(500),Y1(500),X2(500),Y2(500),DELL(500),		MTRX 360
37.	1 SINA(500),COSA(500),XP(500),YP(500)		MTRX 370
38.	2 ,XWAKE(11),YWAKE(11)		MTRX 380
39.	COMMON /TL/ A(500),B(500),AX(500),AY(500),AZ(500),		MTRX 390
40.	1 CX(500),CY(500),CZ(500),AXV(500),AYV(500),		MTRX 400
41.	2 VN(500,5),VT(500,5),BON,IAC,		MTRX 410
42.	3 I,J,JI,SJ,DS,		MTRX 420
43.	4 DX,DY,NI,XJ,YJ,		MTRX 430
44.	5 XK,EEX,EKK,K,PF		MTRX 440
45.C			MTRX 450
46.C	* START		MTRX 460
47.C	* INITIALIZE		MTRX 470
48.	LI=NT		MTRX 480
49.	BON=0.0		MTRX 490
50.	YZERO=0.0		MTRX 500
51.	NSMALL = 0		MTRX 510
52.	REWIND 1		MTRX 520
53.C***	***TEST TYPE OF FLOW AND SET INDICATORS IAC AND IEC		MTRX 530
54.C***	***CROSS FLOW ONLY IAC = -1 IEC = -1		MTRX 540
55.C***	***AXISYMMETRIC FLOW ONLY IAC = +1 IEC = -1		MTRX 550
56.C***	***EXTRA CROSS FLOW ONLY IAC = 0 IEC = 0		MTRX 560


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57.C*** ***CROSS FLOW AND AXISYMMETRIC FLOW IAC = 0 IEC = -1 MTRX 570
58.C*** ***CROSS FLOW AND EXTRA CROSS FLOW IAC = -1 IEC = +1 MTRX 580
59.C*** ***AXISYMMETRIC AND EXTRA CROSS FLOW IAC = +1 IEC = +1 MTRX 590
60.C*** ***AXISYMMETRIC, CROSS, AND EXTRA CROSS IAC=0 IEC = +1 MTRX 600
61. IF(FLG03) 40 , 10 , 40 MTRX 610
62. 10 IF(FLG04) 30 , 20 , 30 MTRX 620
63. 20 IAC = 0 MTRX 630
64. IEC = 0 MTRX 640
65. GO TO 100 MTRX 650
66. 30 IAC = -1 MTRX 660
67. GO TO 70 MTRX 670
68. 40 IF(FLG04) 50 , 60 , 50 MTRX 680
69. 50 IAC = 0 MTRX 690
70. GO TO 70 MTRX 700
71. 60 IAC = 1 MTRX 710
72. 70 IF(FLG21) 80 , 90 , 80 MTRX 720
73. 80 IEC = +1 MTRX 730
74. GO TO 100 MTRX 740
75. 90 IEC = -1 MTRX 750
76. 100 ASSIGN 220 TO K1 MTRX 760
77. IF (FLG15.GT.0) ASSIGN 180 TO K1 MTRX 770
78. 110 DO 130 I=1,L1 MTRX 780
79. DO 120 J = 1,5 MTRX 790
80. VN(I,J) = 0. MTRX 800
81. 120 VT(I,J) = 0. MTRX 810
82. VAN(I)=0.0 MTRX 820
83. 130 VAT(I)=0.0 MTRX 830
84.C CHECK FOR NECESSARY INITIALIZATIONS REQUIRED WHEREVER THE NEW (I.E. MTRX 840
85.C PARABOLIC) FORMULAE ARE TO BE USED ... MTRX 850
86. NOAXI = .TRUE. MTRX 860
87. NOCROS = .TRUE. MTRX 870
88. NOVORT = .TRUE. MTRX 880
89. IF ((IAC.EQ.-1) .AND. (IEC.EQ.-1)) NOCROS = .FALSE. MTRX 890
90. IF ((IAC.EQ.+1) .AND. (IEC.EQ.-1)) NOAXI = .FALSE. MTRX 900
91. IF ((IAC.EQ.0) .AND. (IEC.EQ.-1)) NOAXI = .FALSE. MTRX 910
92. IF ((IAC.EQ.0) .AND. (IEC.EQ.-1)) NOCROS = .FALSE. MTRX 920
93. IF ((IAC.EQ.1) .AND. (IEC.EQ.+1)) NOCROS = .FALSE. MTRX 930
94. IF (FLG15.NE.0) NOVORT = .FALSE. MTRX 940
95. OLDIES = .TRUE. MTRX 950
96. J1 = 1 MTRX 960
97. DO 140 L=1,NB MTRX 970
98. J2 = J1 + ND(L) - 2 MTRX 980
99. IF (NONEW(L)) GO TO 140 MTRX 990
100. OLDIES = .FALSE. MTRX1000
101. CALL COEFF(J1,J2) MTRX1010
102. 140 J1 = J2 + 1 MTRX1020
103. IF (PRIN3) WRITE (6, 610 ) MTRX1030
104.C MTRX1040
105.C MTRX1050
106.C * I MIDPOINT LOOP MTRX1060
107. DO 390 I=1,L1 MTRX1070
108.C * J ELEMENT LOOP MTRX1080
109.C J1 IS THE COORDINATE COUNTER MTRX1090
110.C J IS THE ELEMENT COUNTER MTRX1100
111. J1=0 MTRX1110
112. N1 = 0 MTRX1120
113.C INITIALIZE THE ENTIRE ROW ... MTRX1130

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114.	DO 150 J=1,N1	MTRX1140
115.	AX(J) = 0.0	MTRX1150
116.	AY(J) = 0.0	MTRX1160
117.	AZ(J) = 0.0	MTRX1170
118.	CX(J) = 0.0	MTRX1180
119.	CY(J) = 0.0	MTRX1190
120.	CZ(J) = 0.0	MTRX1200
121.	AXV(J) = 0.0	MTRX1210
122.	150 AYV(J) = 0.0	MTRX1220
123.	IF (FLG23 .GT. 0) CALL NOTS	MTRX1230
124.	IF (PRIN3) WRITE (6, 620) I	MTRX1240
125.	DO 220 M=1,NB	MTRX1250
126.	NOV1 = .FALSE.	MTRX1260
127.	NOV2 = .FALSE.	MTRX1270
128.	IF (ISIGF(K) .EQ. 1) NOV2 = .TRUE.	MTRX1280
129.	IF (ISIGF(K) .EQ. 2) NOV1 = .TRUE.	MTRX1290
130.C		MTRX1300
131.C	BEGIN MATRIX FORMULATION OF THE COLUMNS OF THIS ITH ROW AS INFLUENCED	MTRX1310
132.C	BY THIS KTH BODY ...	MTRX1320
133.	M1 = N1 + 1	MTRX1330
134.	N1 = N1 + ND(K) - 1	MTRX1340
135.	FIRSTE = .TRUE.	MTRX1350
136.	LASTE = .FALSE.	MTRX1360
137.C		MTRX1370
138.C		MTRX1380
139.	DO 170 J=M1,N1	MTRX1390
140.	J1 = J1 + 1	MTRX1400
141.	PF = (FLG18.GT.0 .AND. J.GT.NHA) .OR. (FLG20.GT.0)	MTRX1410
142.	IF (J .EQ. N1) LASTE = .TRUE.	MTRX1420
143.	IF (NONEWK(K)) GO TO 160	MTRX1430
144.C		MTRX1440
145.	CALL PARAB	MTRX1450
146.C	CALL OVERLAY (PAN,1,1,6HRECALL)	C
147.	GO TO 170	MTRX1460
148.C		MTRX1470
149.	160 CALL XYZ	MTRX1480
150.C	160 CALL OVERLAY (PAN,1,2,6HRECALL)	C
151.C		MTRX1490
152.	170 FIRSTE = .FALSE.	MTRX1500
153.C		MTRX1510
154.C		MTRX1520
155.	J1 = J1 + 1	MTRX1530
156.C		MTRX1540
157.C	MATRIX FORMULATION OF COLUMNS FOR THIS BODY HAVE BEEN COMPLETED.	MTRX1550
158.C		MTRX1560
159.	GO TO M1, (180 , 220)	MTRX1570
160.	180 IF (NLF(K).GT.0) GO TO 220	MTRX1580
161.	IF (BON.EQ.0.) GO TO 200	MTRX1590
162.	DO 190 J = M1, N1	MTRX1600
163.	VN(I,K) = VN(I,K)*AXV(J)	MTRX1610
164.	190 VT(I,K) = VT(I,K)*AYV(J)	MTRX1620
165.	GO TO 220	MTRX1630
166.	200 DO 210 J = M1, N1	MTRX1640
167.	VN(I,K) = VN(I,K) + AXV(J)*SINA(I) - AYV(J)*COSA(I)	MTRX1650
168.	210 VT(I,K) = VT(I,K) + AXV(J)*COSA(I) + AYV(J)*SINA(I)	MTRX1660
169.	220 CONTINUE	MTRX1670
170.	IF (PRIN1) WRITE (1) (AX(J),AY(J),CX(J),CY(J),CZ(J),AXV(J),	MTRX1680

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171.      1 AYV(J),J=1,NT)
172.      IF( FLG08 .LE.0 .OR. FLG15 .LE. 0 160 TO 270
173.C
174.C*** * PRINT STRIP VORTEX MATRICES
175.C
176.      IF( I .EQ. 1 .AND. BON .EQ. 0. )WRITE(6, 230 )
177.      IF( I .EQ. 1 .AND. BON .EQ. 1. )WRITE(6, 240 )
178. 230 FORMAT(1H1,31H STRIP VORTEX MATRICES ON BODY //)
179. 240 FORMAT(1H1,31H STRIP VORTEX MATRICES OFF BODY //)
180.      WRITE(6, 250 )1,1 AXV(J),J=1,NT)
181.      WRITE(6, 260 )1,1 AYV(J),J=1,NT)
182. 250 FORMAT(1H0,5H ROW,14/9H X MATRIX / (6E20.7) )
183. 260 FORMAT(1H9 Y MATRIX / (6E20.7) )
184. 270 IF (BON) 280 , 320 , 280
185.C      * SAVE X,Y,Z ON TAPE *OFF BODY POINTS
186.C***      ***SAVE X,Y,Z ON TAPE * OFF BODY POINTS
187.C***      ***AXISYMMETRIC FLOW * TAPE 9
188.C***      ***CROSS FLOW * TAPE 10
189.C***      ***EXTRA CROSS FLOW * TAPE 8
190. 280 IF(IEC.EQ.-1)GO TO 290
191.      WRITE(8) (ECX(J),J=1,NT), (ECY(J),J=1,NT), (ECZ(J),J=1,NT)
192.      IF (IEC) 290 , 390 , 290
193. 290 IF(IAC) 310 , 300 , 300
194. 300 WRITE (9) (AX(J),J=1,NT),(AY(J),J=1,NT),(AZ(J),J=1,NT)
195.      IF (IAC) 390 , 310 , 390
196. 310 WRITE (10)(CX(J),J=1,NT),(CY(J),J=1,NT),(CZ(J),J=1,NT)
197.      GO TO 390
198.C***      ***SAVE ON TAPE * ON BODY
199.C***      ***AXISYMMETRIC FLOW * TAPE 9
200.C***      ***CROSS FLOW * TAPE 10
201.C***      ***EXTRA CROSS FLOW * TAPE 8
202.C***      ***IEC = -1 MEANS NO EXTRA CROSS FLOW
203. 320 IF (IEC.EQ.-1) GO TO 340
204.      DO 330 J = 1,NT
205.      A(J) = -ECX(J)*SINA(I) + ECY(J)*COSA(I)
206. 330 B(J) = ECX(J)*COSA(I) + ECY(J)*SINA(I)
207.      WRITE (8) (A(J),J=1,NT), (B(J),J=1,NT), (ECZ(J),J=1,NT)
208.      IF (IEC) 340 , 390 , 340
209. 340 IF (IAC) 370 , 350 , 350
210. 350 DO 360 J=1,NT
211.      A(J)=-AX(J)*SINA(I)+AY(J)*COSA(I)
212. 360 B(J)=AX(J)*COSA(I)+AY(J)*SINA(I)
213.      WRITE (9) (A(J),J=1,NT),(B(J),J=1,NT),(AZ(J),J=1,NT)
214.      IF (IAC) 390 , 370 , 390
215. 370 DO 380 J=1,NT
216.      A(J)=-CX(J)*SINA(I)+CY(J)*COSA(I)
217. 380 B(J)=CX(J)*COSA(I)+CY(J)*SINA(I)
218.      WRITE (10) (A(J),J=1,NT),(B(J),J=1,NT),(CZ(J),J=1,NT)
219. 390 CONTINUE
220.C
221.      IF (.NOT.PRIN1) GO TO 410
222.C MATRIX PRINT ...
223.      REWIND 1
224.      WRITE (6, 580 )
225.      DO 400 I=1,L1
226.      READ (1) (AX(J),AY(J),CX(J),CY(J),CZ(J),AXV(J),AYV(J),J=1,NT)
227.      WRITE (6, 590 ) (I,J,AX(J),AY(J),CX(J),CY(J),CZ(J),AXV(J),AYV(J),

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MTRX1690
MTRX1700
MTRX1710
MTRX1720
MTRX1730
MTRX1740
MTRX1750
MTRX1760
MTRX1770
MTRX1780
MTRX1790
MTRX1800
MTRX1810
MTRX1820
MTRX1830
MTRX1840
MTRX1850
MTRX1860
MTRX1870
MTRX1880
MTRX1890
MTRX1900
MTRX1910
MTRX1920
MTRX1930
MTRX1940
MTRX1950
MTRX1960
MTRX1970
MTRX1980
MTRX1990
MTRX2000
MTRX2010
MTRX2020
MTRX2030
MTRX2040
MTRX2050
MTRX2060
MTRX2070
MTRX2080
MTRX2090
MTRX2100
MTRX2110
MTRX2120
MTRX2130
MTRX2140
MTRX2150
MTRX2160
MTRX2170
MTRX2180
MTRX2190
MTRX2200
MTRX2210
MTRX2220
MTRX2230
MTRX2240
MTRX2250

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228.      I      J=(,NT)                                MTRX2260
229.      400 CONTINUE                                MTRX2270
230.      REWIND I                                    MTRX2280
231.C                                           MTRX2290
232.      410 IF (PRIN2) WRITE (6, 600 ) (J,A11(J),A12(J),A13(J),A21(J),A22(J), MTRX2300
233.      I      A23(J),J=1,NT)                                MTRX2310
234.      IF (FLG15.LE.0) GO TO 550                    MTRX2320
235.      IF (RON.NE.0.) GO TO 520                    MTRX2330
236.C*** **ON BODY                                MTRX2340
237.      READ (4)                                    MTRX2350
238.C                                           MTRX2360
239.C*** * IF FLG23 .GT. 0 INPUT NNU MUST BE NONE, HENCE NNU = 0 HERE MTRX2370
240.C                                           MTRX2380
241.      IF (NNU.LE.0) GO TO 430                    MTRX2390
242.      DO 420 I = 1, NNU                            MTRX2400
243.      READ (4) MSF, (A(J),J=1,NT), (B(J),J=1,NT) MTRX2410
244.      420 WRITE (3) MSF, (A(J),J=1,NT), (B(J),J=1,NT) MTRX2420
245.      REWIND 3                                    MTRX2430
246.      REWIND 4                                    MTRX2440
247.      READ (4)                                    MTRX2450
248.      430 N=NSIGA-1                                MTRX2460
249.      IF (FLG16.GT.1) N=NSIGA                    MTRX2470
250.C*** **N = 0 MEANS 1 RHS ONLY NO NON-UNIFORM FLOW MTRX2480
251.C*** * IF FLG23 .GT. 0 INPUT NNU MUST BE NONE, HENCE N = 0 HERE MTRX2490
252.C                                           MTRX2500
253.      IF (N.EQ.0) GO TO 450                    MTRX2510
254.      DO 440 I = 1, N                            MTRX2520
255.      READ (3) MSF, (A(J),J=1,NT), (B(J),J=1,NT) MTRX2530
256.      440 WRITE (4) MSF, (A(J),J=1,NT), (B(J),J=1,NT) MTRX2540
257.      450 M=0                                    MTRX2550
258.C*** * SKIP PRESCRIBED VORTEX INPUTS ON 4 SO THAT STRIP VORTEX MTRX2560
259.C*** * SUMMATIONS CAN GO BEHIND IT            MTRX2570
260.C                                           MTRX2580
261.      IF(FLG23 .GT. 0)READ(4)                    MTRX2590
262.      DO 460 J = 1, NB                            MTRX2600
263.      IF (NLF(J).GT.0) GO TO 460                    MTRX2610
264.      NSIGA=NSIGA+1                                MTRX2620
265.      NNU=NNU+1                                    MTRX2630
266.      WRITE (4) M, (VN(I,J),I=1,NT), (VT(I,J),I=1,NT) MTRX2640
267.      460 CONTINUE                                MTRX2650
268.C                                           MTRX2660
269.C*** * SINCE NO NNU IS INPUT WITH FLG23 GT 0, NSIGA IS MAX OF 1 AND M MTRX2670
270.C*** * SHOUL BE 0 IF FLG17 LE 0. DONT USE FLG17 WITH FLG23 MTRX2680
271.C                                           MTRX2690
272.      IF (FLG23 .LE. 0)GO TO 490                    MTRX2700
273.C                                           MTRX2710
274.C*** * RING WING OPTION - FORM COLUMN (PARTLY) FOR PRESCRIBED VORTICITY MTRX2720
275.C*** *RHS                                MTRX2730
276.C                                           MTRX2740
277.      IBOD = 0                                    MTRX2750
278.      DO 480 J=1,NB                            MTRX2760
279.      IF( NLF(J) .GT. 0)GO TO 480                    MTRX2770
280.      IBOD = IBOD + 1                                MTRX2780
281.C                                           MTRX2790
282.C*** * CONVERT (ON BODY) X,Y TO NORMAL, TANGENTIAL MTRX2800
283.C                                           MTRX2810
284.      DO 470 I=1,NT                                MTRX2820

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285.      VAN(I)=VA(I,IBOD)*SINA(I)-VR(I,IBOD)*COSA(I)
286.470    VAT(I)=VA(I,IBOD)*COSA(I)+VR(I,IBOD)*SINA(I)
287.      WRITE(4)(VAN(I),I=1,NT),(VAT(I),I=1,NT)
288.      480 CONTINUE
289.      490 M = NSIGC - 1
290.      IF (FLG17.GT.0) M=NSIGC
291.      IF (M.LE.0) GO TO 510
292.      DO 500 I = 1, M
293.      READ (3) MSF,(A(J),J=1,NT),(B(J),J=1,NT)
294.      500 WRITE (4) MSF,(A(J),J=1,NT),(B(J),J=1,NT)
295.      510 REWIND 3
296.      GO TO 550
297.C*** **OFF BODY
298.      520 DO 530 J = 1, NB
299.      IF (NLF(J).GT.0) GO TO 530
300.      WRITE(4) (VN(I,J), I = 1,L1), (VT(I,J),I = 1,L1)
301.      530 CONTINUE
302.      IF(FLG23 .LE. 0)GO TO 550
303.      IBOD = 0
304.      DO 540 J=1,NB
305.      IF( NLF(J) .GT. 0)GO TO 540
306.      IBOD = IBOD + 1
307.      WRITE(4) (VA(I,IBOD),I=1,L1), (VR(I,IBOD),I=1,L1)
308.      540 CONTINUE
309.C      * TEST IF OFF BODY COMPLETED
310.C      * TEST IF OFF BODY
311.      550 IF (FLG05.EQ.0.OR.BON.NE.0.) GO TO 570
312.C      * INITIAL FOR OFF BODY * THEN RE-ENTER J, J LOOPS
313.      BON=1.
314.      L1=NB*(NB+1)
315.      IF (.NOT. OLDIES) GO TO 110
316.      DO 560 I=1,L1
317.      X2(I) = XP(I)
318.      560 Y2(I) = YP(I)
319.      GO TO 110
320.      570 REWIND 9
321.      REWIND 8
322.      REWIND 10
323.      REWIND 4
324.      RETURN
325.C
326.      580 FORMAT(51HVELOCITY INFLUENCE COEFFICIENT MATRICES FOLLOW ...,/
327.      1 3X,1H1,4X,1HJ,7X,2HAX,11X,2HAY,14X,2HCX,11X,2HCY,11X,2HCZ,14X,
328.      2 3HAXV,10X,3HAYV,71H )
329.      590 FORMAT(1H ,I3,I4,2F13.6,3X,3F13.6,3X,2F13.6)
330.      600 FORMAT(4H1 J,5X,3HA11,8X,3HA12,8X,3HA13,8X,3HA21,8X,3HA22,8X,
331.      1 3HA23,77(1H ,I3,1X,6F11.6))
332.      610 FORMAT(1H1,20X,36HDETAIL OF VIJ MATRIX FORMULATION ...,1HD)
333.      620 FORMAT(1H0,25(5H****),1H ,60X,3HROW,14)
334.      END

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MTRX2850
MTRX2860
MTRX2870
MTRX2880
MTRX2890
MTRX2900
MTRX2910
MTRX2920
MTRX2930
MTRX2940
MTRX2950
MTRX2960
MTRX2970
MTRX2980
MTRX2990
MTRX3000
MTRX3010
MTRX3020
MTRX3030
MTRX3040
MTRX3050
MTRX3060
MTRX3070
MTRX3080
MTRX3090
MTRX3100
MTRX3110
MTRX3120
MTRX3130
MTRX3140
MTRX3150
MTRX3160
MTRX3170
MTRX3180
MTRX3190
MTRX3200
MTRX3210
MTRX3220
MTRX3230
MTRX3240
MTRX3250
MTRX3260
MTRX3270
MTRX3280
MTRX3290
MTRX3300
MTRX3310
MTRX3320

Line	Code	Statement	MSNA
1.		SUBROUTINE MISNA2 (SIG)	18
2.C			20
3.C			10
4.C		* SOLVE LINEAR SIMULTANEOUS EQUATIONS BY SEIDEL ITERATION	30
5.C			40
6.	COMMON	HEDR(10), CASE, NNR, NNU	50
7.	1	,FLG03, ,FLG04, ,FLG05, ,FLG06, ,FLG07	60
8.	2	,FLG08, ,FLG09, ,FLG10, ,FLG11, ,FLG12	70
9.	3	,FLG13, ,FLG14, ,FLG15, ,FLG16, ,FLG17	80
10.	4	,FLG18, ,FLG19, ,FLG20, ,FLG21, ,FLG22	90
11.	5	,FLG23, ,FLG24, ,FLG25, ,FLG26, ,FLG27	100
12.	COMMON	NT, NO(11), MN, NUNA(5), TYPEA(5),	110
13.	1	NER1, NER2, NMA, NSIGA, NSIGC,	120
14.	2	NUNC(5), TYPEC(5), NLF(11), ICC, NSIGFC,	130
15.	3	TYPEEC(5), NUNEC(5)	140
16.	DOUBLE PRECISION	HEDR, CASE	150
17.	INTEGER	FLG03, ,FLG04, ,FLG05, ,FLG06, ,FLG07	160
18.	1	,FLG08, ,FLG09, ,FLG10, ,FLG11, ,FLG12	170
19.	2	,FLG13, ,FLG14, ,FLG15, ,FLG16, ,FLG17	180
20.	3	,FLG18, ,FLG19, ,FLG20, ,FLG21, ,FLG22	190
21.	4	,FLG23, ,FLG24, ,FLG25, ,FLG26, ,FLG27	200
22.	REAL	MN	210
23.C			220
24.	COMMON /C27	A(500,4), R(500,4), NSIG, IT	230
25.C			240
26.	DIMENSION	SIG(500,4), KFLAG(4), DSIG(4), DSIG(500,4)	250
27.C			260
28.C		* START	270
29.C		* INITIALIZE	280
30.	NTU=0		290
31.	ITER=0		300
32.	NCONV=0		310
33.	DO 10 J=1,NSIG		320
34.	KFLAG(J)=0		330
35.	DO 10 I=1,NT		340
36.	10 SIG(I,J)=0.0		350
37.	20 DO 30 I=1,NSIG		360
38.	30 DSIG(11)=0.0		370
39.C		* COMPUTE SIGMA AND DELTA SIGMA	380
40.	DO 140 I=1,NT		390
41.	IF (NTU-3) 40, 90, 100		400
42.	40 IF (FLG12.NE.0) GO TO 60		410
43.C		* PLACE A IN LEFT SIDE MATRIX	420
44.	IF (IT.EQ.10) GO TO 50		430
45.	READ (9) (A(I),L=1,NT)		440
46.	GO TO 80		450
47.	50 READ (10) (A(I),L=1,NT)		460
48.	GO TO 80		470
49.C		* PLACE PHI IN LEFT SIDE MATRIX	480
50.	60 IF (IT.EQ.10) GO TO 70		490
51.	READ (9) (A(I),L=1,NT), (A(I),L=1,NT), (A(I),L=1,NT)		500
52.	GO TO 80		510
53.	70 READ (10) (A(I),L=1,NT), (A(I),L=1,NT), (A(I),L=1,NT)		520
54.C		* SAVE LEFT SIDE MATRIX	530
55.	80 WRITE (3) (A(I),L=1,NT)		540
56.	WRITE (11) (A(I),L=1,NT)		550

57.	GO TO 110	MSNA 570
58.C	* READ LEFT SIDE MATRIX	MSNA 580
59.	90 READ (3) (A(L),L=1,NT)	MSNA 590
60.	GO TO 110	MSNA 600
61.	100 READ (11) (A(L),L=1,NT)	MSNA 610
62.	110 DO 140 J=1,NSIG	MSNA 620
63.	IF (KFLAG(J).NE.0) GO TO 140	MSNA 630
64.	SUM=D.0	MSNA 640
65.	DO 120 L=1,NT	MSNA 650
66.	120 SUM=SUM+A(L)*SIG(L,J)	MSNA 660
67.	DSIG(I,J)=(R(I,J)-SUM)/A(I)	MSNA 670
68.	IF (FLG09.NE.0) GO TO 130	MSNA 680
69.	SIG(I,J)=SIG(I,J)+DSIG(I,J)	MSNA 690
70.	130 IF (ABS(DSIG(I,J)).GT.DSIG(I,J)) DSIG(I,J)=ABS(DSIG(I,J))	MSNA 700
71.	140 CONTINUE	MSNA 710
72.	IF (FLG09.LE.0) GO TO 160	MSNA 720
73.	DO 150 J=1,NSIG	MSNA 730
74.	DO 150 I=1,NT	MSNA 740
75.	150 SIG(I,J)=SIG(I,J)+DSIG(I,J)	MSNA 750
76.C	* TEST FOR SOLUTION	MSNA 760
77.	160 REWIND 3	MSNA 770
78.	REWIND 11	MSNA 780
79.	ITER=ITER+1	MSNA 790
80.	DO 170 J=1,NSIG	MSNA 800
81.	IF (KFLAG(J).NE.0) GO TO 170	MSNA 810
82.	IF (DSIG(I,J).GE.1.E-6) GO TO 170	MSNA 820
83.	KFLAG(J)=ITER	MSNA 830
84.	NCONV=NCONV+1	MSNA 840
85.	IF (NCONV.EQ.NSIG) GO TO 190	MSNA 850
86.	170 CONTINUE	MSNA 860
87.	IF (ITER.EQ.100) GO TO 190	MSNA 870
88.	IF (NTU.EQ.3) GO TO 180	MSNA 880
89.	NTU=3	MSNA 890
90.	GO TO 20	MSNA 900
91.	180 NTU=11	MSNA 910
92.	GO TO 20	MSNA 920
93.C	* PRINT NO. OF ITERATIONS	MSNA 930
94.	190 DO 230 J=1,NSIG	MSNA 940
95.	IF (KFLAG(J).NE.0) GO TO 210	MSNA 950
96.	WRITE (6, 200)	MSNA 960
97.	200 FORMAT (1HD 7X 36H NO CONVERGENCE AFTER 100 ITERATIONS)	MSNA 970
98.	GO TO 230	MSNA 980
99.	210 WRITE (6, 220) KFLAG(J)	MSNA 990
100.	220 FORMAT (1HD 5X 15,1X 36H ITERATIONS REQUIRED FOR CONVERGENCE)	MSNA 1000
101.	230 CONTINUE	MSNA 1010
102.	RETURN	MSNA 1020
103.	END	MSNA 1030

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57.	KAY = ANAYF(2, Y , YWAKE(IBOD))	
58.	CALL OCTOMEGA,QM,Q)	NOTS 530
59.C		NOTS 540
60.C	*** SMALLR IS Y	
61.C	*** BGR IS YWAKE(IBOD)	NOTS 560
62.	IF(Y .LE. YWAKE(IBOD)) GO TO 10	
63.C		NOTS 580
64.C	*** SMALLR GT BGR	NOTS 590
65.C		NOTS 600
66.	BIGR = (2 / (SQRT(Y * YWAKE(IBOD)) * 2.0)) * QM -	NO
67.	1 (1.570796 * HLAMB(BETA,KAY))	NOTS 620
68.	GO TO 20	NOTS 630
69.C		NOTS 640
70.C***	* SMALLR LE BGR	NOTS 650
71.C		NOTS 660
72.	10 BGR = 3.141593 * (2 / (SQRT(Y * YWAKE(IBOD)) * 2.0)) * QM	NOTS 67
73.	1 (1.570796 * HLAMB(BETA,KAY))	NOTS 680
74.C		NOTS 690
75.C***	* NOTE THAT VA AND VR WILL NOT YET BE MULTIPLIED BY DGAMMA/DZ	NOTS 700
76.C***	* WHICH IS REALLY THE INPUT PRESCRIBED VORTICITY	NOTS 710
77.C		NOTS 720
78.	20 VAI(,IBOD) = BGR / 6.283185	NOTS 730
79.	30 VRI(,IBOD) = -10 * (SQRT(YWAKE(IBOD) / Y)) / 6.283185	NOTS 740
80.	RETURN	NOTS 750
81.	END	NOTS 760

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50.PRAB      25 AUG 75 18
1.          SUBROUTINE PARAB      PARR 21
2.C          PARR 10
3.C          OVERLAY (PAN,1,2)    C
4.C          PROGRAM PARAB        C
5.C          PARR 30
6.C          CONTROL FOR PARABOLIC X,Y,Z MATRICES COMPUTATION. PARR 40
7.C          PARR 50
8.          COMMON HEDR(10),CASE,NR,NNU      PARR 60
9.          1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07 PARR 70
10.         2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12 PARR 80
11.         3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17 PARR 90
12.         4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22 PARR 100
13.         5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27 PARR 110
14.         COMMON NT, NO(11), MN, NUNA(5), TYPEA(5), PARR 120
15.         1 NER1, NER2, NMA, NSIGA, NSIGC, PARR 130
16.         2 NUNC(5), TYPEC(5), NLF(11), IEC, NSIGEC, PARR 140
17.         3 TYPEEC(5), NUNEC(5) PARR 150
18.         COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DCLL(500), PARR 160
19.         1 SINA(500), COSA(500), XP(500), YP(500) PARR 170
20.         2 ,XWAKE(11), YWAKE(11) PARR 180
21.         COMMON /TL/ A1(500), R1(500), AX(500), AY(500), AZ(500), PARR 190
22.         1 CX(500), CY(500), CZ(500), AXV(500), AYV(500), PARR 200
23.         2 VN(500,5), VT(500,5), BON, IAC, PARR 210
24.         3 I, J, J1, SJ, DS, PARR 220
25.         4 DX, DY, NI, XJ, YJ, PARR 230
26.         5 XK, EEK, CKK, K, PF PARR 240
27.         COMMON /BLOCK2/ HCURV(500), HARC(500) PARR 250
28.         COMMON /BLOCK3/ NOAXI, NOCROS, NOVORT, NOV1, NOV2, FIRSTC, LASTC, LSSE, SQ, PARR 260
29.         1 NSMALL PARR 270
30.         LOGICAL NOAXI, NOCROS, NOVORT, NOV1, NOV2, FIRSTC, LASTC PARR 280
31.         DOUBLE PRECISION HEDR, CASE PARR 290
32.         INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07 PARR 300
33.         1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12 PARR 310
34.         2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17 PARR 320
35.         3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22 PARR 330
36.         4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27 PARR 340
37.         REAL L PARR 350
38.C          PARR 360
39.          IF (BON .NE. 0.0) GO TO 20 PARR 370
40.C          (NOTE ... BON=0.0 FOR ON-BODY POINTS, BON=1.0 FOR OFF-BODY POINTS.) PARR 380
41.          IF (I .NE. J) GO TO 3C PARR 390
42.C          PARR 400
43.C          I=J PATH ... PARR 410
44.          SPRIME = HARC(1) PARR 420
45.          ETA = SPRIME/Y2(1) PARR 430
46.          IF (ETA .GT. .CB) GO TO 1C PARR 440
47.C          PARR 450
48.C          ENTIRE ELEMENT IS TO BE CONSIDERED THE SINGULAR SUB-ELEMENT ... PARR 460
49.          LSSE = SPRIME PARR 470
50.          CALL PARAB1 PARR 480
51.          GO TO 90 PARR 490
52.C          PARR 500
53.C          USE ONLY THE CENTRAL PORTION OF THE ELEMENT AS THE SINGULAR PARR 510
54.C          SUB-ELEMENT AND THEN ADD IN THE 2 END PIECE CONTRIBUTIONS ... PARR 520
55.          10 LSSE = .0A*Y2(1) PARR 530
56.          CALL PARAB1 PARR 540

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57.	XJ = X2(I)	PARB 550
58.	YJ = Y2(I)	PARB 560
59.	NI = 33	PARB 570
60.	DS = (SPRIME-LSSE)/32.	PARB 580
61.	SD = -SPRIME	PARB 590
62.	CALL PARAB2	PARB 600
63.	SD = -SD	PARB 610
64.	DS = -DS	PARB 620
65.	CALL PARAB2	PARB 630
66.	GO TO 90	PARB 640
67.C		PARB 650
68.C	1.NE.J PATH ...	PARB 660
69.C	COMPUTE MINIMUM DISTANCE TO JTH CONTROL POINT FROM THE JTH ELEMENT	PARB 670
70.C	ENDS AND CONTROL POINT ...	PARB 680
71.C		PARB 690
72.C	OFF-BODY ...	PARB 700
73.	20 J1P1 = J1 + 1	PARB 710
74.	D1 = (XP(I)-X1(J1))**2 + (YP(I)-Y1(J1))**2	PARB 720
75.	D2 = (XP(I)-X2(J1))**2 + (YP(I)-Y2(J1))**2	PARB 730
76.	D3 = (XP(I)-X1(J1P1))**2 + (YP(I)-Y1(J1P1))**2	PARB 740
77.	GO TO 40	PARB 750
78.C		PARB 760
79.C	ON-BODY	PARB 770
80.	30 J1P1 = J1 + 1	PARB 780
81.	D1 = (X2(I)-X1(J1))**2 + (Y2(I)-Y1(J1))**2	PARB 790
82.	D2 = (X2(I)-X2(J1))**2 + (Y2(I)-Y2(J1))**2	PARB 800
83.	D3 = (X2(I)-X1(J1P1))**2 + (Y2(I)-Y1(J1P1))**2	PARB 810
84.C		PARB 820
85.	40 DMINSQ = D1	PARB 830
86.	IF (D2 .LT. DMINSQ) DMINSQ = D2	PARB 840
87.	IF (D3 .LT. DMINSQ) DMINSQ = D3	PARB 850
88.	DMIN = SQRT(DMINSQ)	PARB 860
89.	IF (DMIN .EQ. 0.0) GO TO 60	PARB 870
90.	NI = 16.*HARC(J)/DMIN + 0.9	PARB 880
91.	IF (NI .GT. 0) GO TO 50	PARB 890
92.	NI = 3	PARB 900
93.	DS = HARC(J)	PARB 910
94.	GO TO 80	PARB 920
95.	50 NI = 2*NI	PARB 930
96.	IF (NI .GT. 128) GO TO 70	PARB 940
97.	60 NI = 128	PARB 950
98.	DS = HARC(J)/64.	PARB 960
99.	GO TO 80	PARB 970
100.	70 XNI = NI	PARB 980
101.	DS = 2.*HARC(J)/XNI	PARB 990
102.	NI = NI + 1	PARB1000
103.	80 XJ = X2(J)	PARB1010
104.	YJ = Y2(J)	PARB1020
105.	SD = -HARC(J)	PARB1030
106.	CALL PARAB2	PARB1040
107.C		PARB1050
108.	90 RETURN	PARB1060
109.C	90 CONTINUE	C
110.C		PARB1070
111.	END	PARB1080

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50.	PRAB1		25 AUG 75	18
1.	SUBROUTINE PARAB1		PRB1	20
2.C			PRB1	10
3.C			PRB1	30
4.C	THIS ROUTINE CALCULATES THE SINGULAR SUB-ELEMENT VELOCITY		PRB1	40
5.C	CONTRIBUTION FOR FLAT OR CURVED ELEMENTS, WITH PIECEWISE		PRB1	50
6.C	CONSTANT-, LINEAR-, OR QUADRATIC-SOURCE DENSITY.		PRB1	60
7.C			PRB1	70
8.	COMMON /BLOCK2/HCURV(500), HARC(500)		PRB1	80
9.	COMMON /BLOCK3/NOAXI, NOCROS, NOVORT, NOV1, NOV2, FIRSTE, LASTE, LSSE, SO,		PRB1	90
10.	1 NSRALL		PRB1	100
11.	COMMON /BLOCK4/A11(500), A12(500), A13(500), A21(500), A22(500),		PRB1	110
12.	A23(500)		PRB1	120
13.	COMMON /TL/ A(500), B(500), AX(500), AY(500), AZ(500),		PRB1	130
14.	1 CX(500), CY(500), CZ(500), AXV(500), AYV(500),		PRB1	140
15.	2 VN(500,5), VT(500,5), BON, IAC,		PRB1	150
16.	3 I, J, J1, SJ, DS,		PRB1	160
17.	4 OX, DY, NI, XJ, YJ,		PRB1	170
18.	5 XK, EEK, EKK, K, PF		PRB1	180
19.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELL(500),		PRB1	190
20.	1 SINA(500), COSA(500), XP(500), YP(500)		PRB1	200
21.	2 ,XWAKE(11), YWAKE(11)		PRB1	210
22.	COMMON /PRINT/ PRIN1, PRIN2, PRIN3		PRB1	220
23.	LOGICAL PRIN1, PRIN2, PRIN3		PRB1	230
24.	LOGICAL NOAXI, NOCROS, NOVORT, NOV1, NOV2, FIRSTE, LASTE		PRB1	240
25.	REAL LSSE		PRB1	250
26.	DATA ALOG8/2.C79447, TWOPI/6.2831857		PRB1	260
27.	LOGICAL PF			
28.C	NOTE.....		PRB1	270
29.C	LSSE = DIMENSIONAL HALF-LENGTH OF THE SINGULAR SUB-ELEMENT.		PRB1	280
30.C	CAPSP = CAPSP = NON-DIMENSIONAL HALF-ARC LENGTH OF		PRB1	290
31.C	SINGULAR SUB-ELEMENT (WHICH MAY BE .LE. TOTAL HALF-ARC LENGTH		PRB1	300
32.C	OF THIS ELEMENT)		PRB1	310
33.C			PRB1	320
34.	R = Y2(J)		PRB1	330
35.	C = HCURV(J)*R		PRB1	340
36.	CAPSP=LSSE/R		PRB1	350
37.	SIN=SINA(J)		PRB1	360
38.	COS=COSA(J)		PRB1	370
39.	SC=SIN*COS		PRB1	380
40.	SOS=CAPSP/8.0		PRB1	390
41.	ALOGS8=ALOG(SOS)		PRB1	400
42.	ALOGS=ALOG(CAPSP)		PRB1	410
43.	SSQ=SIN**2		PRB1	420
44.	CSQ=COS**2		PRB1	430
45.	S3 =CAPSP**3		PRB1	440
46.	RSQ=R**2		PRB1	450
47.	CC = C**2		PRB1	460
48.	N = J		PRB1	470
49.	IF (FIRSTE) M=J+1		PRB1	480
50.	IF (LASTE) M=J-1		PRB1	490
51.	MM1=M-1		PRB1	500
52.	MM1=M+1		PRB1	510
53.C	CHECK FOR AXISYMMETRIC FLOW.....		PRB1	520
54.	IF(NOAXI) GO TO 10		PRB1	530
55.	VCAX=(2.*SC-4.*C*SIN)*CAPSP+(SC*(SSQ/12.+1.8055555+ALOGS8/12.)*		PRB1	540
56.	1C/32.)*(-4.*SC-8.*C*SIN**2.*SIN*SSQ+2.*SIN-8.*C*SC-2.*ALOG8*STN		PRB1	550

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57. 2.*SIN*16.*ALOGS*SIN))*S3 + TWOPI*SIN PRB1 560
58. VCAY=(2.*ALOGS8+2.*SSQ+4.*C*COS)*CAPSP+(-3.*3.*ALOGS8+2.*SSQ**2 PRB1 570
59. 1 +3.*SSQ-8.*C*(COS+1.)-6.*C*ALOG8*COS-32.*C**3*COS+16.*C**2 PRB1 580
60. 2 +2.*C*COS-12.*C*SIN*SC+ALOGS*(4.*C )-1.3333333*C*COS)*S3/24. PRB1 590
61. 3 -TWOPI*COS PRB1 600
62. AX(J) = AX(J) + VCAX PRB1 610
63. AY(J) = AY(J) + VCAY PRB1 620
64.C PRB1 630
65. IF (NOV1) GO TO 1C PRB1 640
66. V1AX= R*(4.*COS*CAPSP + (COS*(-7.*-6.*ALOGS8-6.*SSQ)+24.*C* PRB1 650
67. 1 (CSQ-2.*C*COS-2.*SSQ))*S3/36.) PRB1 660
68. V1AY= R*(4.*SIN*CAPSP+(-6.*SIN*SSQ+6.*SIN*ALOGS8-11.*SIN+48.*C*C PRB1 670
69. 1 -48.*C**2*SIN))*S3/36.) PRB1 680
70. AX(MM1)=AX(MM1)+A11(J)*V1AX PRB1 690
71. AY(MM1)=AY(MM1)+A11(J)*V1AY PRB1 700
72. AX(M)=AX(M)+A12(J)*V1AX PRB1 710
73. AY(M)=AY(M)+A12(J)*V1AY PRB1 720
74. AX(MP1)=AX(MP1)+A13(J)*V1AX PRB1 730
75. AY(MP1)=AY(MP1)+A13(J)*V1AY PRB1 740
76.C PRB1 750
77. IF (NOV2) GO TO 1D PRB1 760
78. V2AX=RSQ*((12.*SC-4.*C*SIN)*S3/3.) PRB1 770
79. V2AY= RSQ*(ALOGS8+0.66666667*SSQ+2.*C*COS)*2.*S3/3. PRB1 780
80. AX(MM1)=AX(MM1)+A21(J)*V2AX PRB1 790
81. AY(MM1)=AY(MM1)+A21(J)*V2AY PRB1 800
82. AX(M)=AX(M)+A22(J)*V2AX PRB1 810
83. AY(M)=AY(M)+A22(J)*V2AY PRB1 820
84. AX(MP1)=AX(MP1)+A23(J)*V2AX PRB1 830
85. AY(MP1)=AY(MP1)+A23(J)*V2AY PRB1 840
86.C PRB1 850
87.C CHECK FOR CROSSFLOW..... PRB1 860
88. 1D IF (NOCROS) GO TO 2D PRB1 870
89. VDCX=2.*(SIN*(COS-2.*C)*CAPSP+(-SC*(9.*6.*ALOGS8-2.*SSQ) PRB1 880
90. 1 +SIN*C*(12.*ALOG8-10.*-12.*SSQ-8.*CSQ-32.*C*COS+8.*SIN PRB1 890
91. 2 +32.*C**2+4.*-12.*ALOGS))*S3/48.) + TWOPI*SIN PRB1 900
92. VDCY=2.*((12.*SSQ+ALOGS8+2.*C)*CAPSP+(9.*(27.*-24.*SSQ)*ALOGS8 PRB1 910
93. 1 +6.*SSQ**2-43.*SSQ-36.*C*SIN*SC+48.*C**2*CSQ-96.*C**3*COS + PRB1 920
94. 2C+160.*COS*ALOGS8+84.*COS-12.))*S3/144.) - TWOPI*COS PRB1 930
95. VDCZ=-4.*(1.*ALOGS8)*CAPSP+((16.*SSQ-9.)*ALOGS8+10.*SSQ PRB1 940
96. 1 +C*(24.*-16.*COS-24.*COS*ALOGS8))*S3/36. PRB1 950
97. CX(J)=CX(J)+VDCX PRB1 960
98. CY(J)=CY(J)+VDCY PRB1 970
99. CZ(J)=CZ(J)+VDCZ PRB1 980
100.C PRB1 990
101. IF (NOV1) GO TO 2C PRB11000
102. V1CX=P*(4.*COS*CAPSP+C.66666667*(COS*(0.75*ALOGS8+0.375 PRB11010
103. 1 -0.25*SSQ)+C*(CSQ-SSQ-2.*C*COS))*S3) PRB11020
104. V1CY= R*(4.*SIN*CAPSP+(SIN*(-6.*SSQ+30.*ALOGS8+29. PRB11030
105. 1 +48.*C*(COS-C))*S3/36.) PRB11040
106. V1CZ= R*(0.66666667*SIN*(-ALOGS8-1.3333333 )*S3) PRB11050
107. CX(MM1)=CX(MM1)+A11(J)*V1CX PRB11060
108. CY(MM1)= CY(MM1)+A11(J)*V1CY PRB11070
109. CZ(MM1)=CZ(MM1)+A11(J)*V1CZ PRB11080
110. CX(M)= CX(M) + A12(J)*V1CX PRB11090
111. CY(M)= CY(M) + A12(J)*V1CY PRB11100
112. CZ(M)= CZ(M) + A12(J)*V1CZ PRB11110
113. CX(MP1)= CX(MP1) + A13(J)*V1CX PRB11120

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114.      CY(MP1) = CY(MP1) + A13(J)*VICY
115.      CZ(MP1) = CZ(MP1) + A13(J)*VICZ
116.C
117.      IF (NOV2) GO TO 21
118.      V2CX=RSQ*(0.66666667*SIN*(COS-2.*C)*S3)
119.      V2CY=RSQ*(16.*6.*ALOGS8+6.*SSQ+12.*C*COS)*S3/9.)
120.      V2CZ=RSQ*(0.66666667*(-2.*ALOGS8-3.3333333)*S3)
121.      CX(MM1)=CX(MM1)+A21(J)*V2CX
122.      CY(MM1)=CY(MM1)+A21(J)*V2CY
123.      CZ(MM1)=CZ(MM1)+A21(J)*V2CZ
124.      CX(M) = CX(M)+A22(J)*V2CX
125.      CY(M)=CY(M)+A22(J)*V2CY
126.      CZ(M)=CZ(M)+A22(J)*V2CZ
127.      CX(MP1)=CX(MP1)+A23(J)*V2CX
128.      CY(MP1)=CY(MP1)+A23(J)*V2CY
129.      CZ(MP1)=CZ(MP1)+A23(J)*V2CZ
130.C
131.C      CHECK FOR VORTEX FLOW.....
132.      20 IF (NOVRT) GO TO 30
133.      VCVX= (2.*(ALOGS8-SSQ-2.*C*COS))*CAPSP + (-9.*ALOGS8*(-9.*12.*SSQ)
134.      1 +SSQ*(23.*144.*CC-6.*SSQ) -24.*C + COS*(-72.*SSC + C*(-22.
135.      2 +12.*ALOG8+108.*SSQ+60.*ALOGS-48.*C*(COS+C))) *S3/72.
136.      3 + TWOPI*COS
137.      VCVY= 2.*(SC-2.*C*SIN)*CAPSP-(SC*(9.*6.*ALOGS8
138.      1 -2.*SSQ-24.*C*COS+96.*C**2)*SIN*C*(62.*132.*SSQ
139.      2 -36.*ALOG8))*S3/24. + 0.88888888*ALOGS*C*SIN*S3 + TWOPI*SIN
140.      AXV(J) = VDVX
141.      AYV(J) = VCVY
142.C
143.C
144.      30 IF (.NOT. PRIN3) GO TO 40
145.      WRITE (6, 50 ) J,CAPSP
146.      WRITE (6, 60 ) V2AX,V2AY,V2CX,V2CY,V2CZ,VDVX,VDVY
147.      IF (NOV1) GO TO 40
148.      WRITE (6, 70 ) V1AX,V1AY,V1CX,V1CY,V1CZ
149.      IF (NOV2) GO TO 40
150.      WRITE (6, 80 ) V2AX,V2AY,V2CX,V2CY,V2CZ
151.C
152.40      IF(.NOT.PF)RETURN
153.      AX(J)=AXV(J)-TWOPI*COS
154.      AY(J)=AYV(J)-TWOPI*SIN
155.      AXV(J)=AX(J)
156.      AYV(J)=AY(J)
157.      RETURN
158.C
159.C
160.      50 FORMAT(10PARAB1. Y=J=*,I3,*, CAPSP=*,F8.5)
161.      60 FORMAT(1H,10X,'V2AX=*,F9.5,*, V2AY=*,F9.5,*, V2CX=*,F9.5,
162.      1 *, V2CY=*,F9.5,*, V2CZ=*,F9.5,*, VDVX=*,F9.5,*, VDVY=*,F9.5)
163.      70 FORMAT(1H,10X,'V1AX=*,F9.5,*, V1AY=*,F9.5,*, V1CX=*,F9.5,
164.      1 *, V1CY=*,F9.5,*, V1CZ=*,F9.5)
165.      80 FORMAT(1H,10X,'V2AX=*,F9.5,*, V2AY=*,F9.5,*, V2CX=*,F9.5,
166.      1 *, V2CY=*,F9.5,*, V2CZ=*,F9.5)
167.      END

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PRB1113G
 PRB1114C
 PRB1115D
 PRB1116D
 PRB1117C
 PRB1118D
 PRB1119D
 PRB1120C
 PRB1121D
 PRB1122D
 PRB1123D
 PRB1124C
 PRB1125D
 PRB1126D
 PRB1127C
 PRB1128D
 PRB1129D
 PRB1130D
 PRB1131D
 PRB1132C
 PRB1133D
 PRB1134C
 PRB1135D
 PRB1136D
 PRB1137D
 PRB1138D
 PRB1139C
 PRB1140D
 PRB1141D
 PRB1142D
 PRB1143D
 PRB1144C
 PRB1145C
 PRB1146D
 PRB1147D
 PRB1148D
 PRB1149C
 PRB1150D
 PRB1152D
 PRB1153C
 PRB1154D
 PRB1155D
 PRB1156C
 PRB1157D
 PRB1158C
 PRB1159D
 PRB1160D
 PRB1161D

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SO.PRAB2		25 AUG 75	16
1.	SUBROUTINE PARAB2	PRB2	20
2.C		PRB2	10
3.C	THIS ROUTINE CALCULATES THE VELOCITY CONTRIBUTIONS OF	PRB2	30
4.C	OFF-DIAGONAL (AND ENDS OF THE ON-DIAGONAL) ELEMENTS BY A	PRB2	40
5.C	SIMPSON-RULE. ELEMENTS MAY BE FLAT OR CURVED, WITH PIECEWISE	PRB2	50
6.C	CONSTANT-, LINEAR-, OR QUADRATIC-SOURCE DENSITY.	PRB2	60
7.	COMMON /BLOCK2/HCURV(500), HARC(500)	PRB2	70
8.	COMMON /BLOCK3/NOAXI,NOCROS,NOVORT,NOV1,NOV2,FIRSTE,LASTE,LSSE,SO,	PRB2	80
9.	1 NSMALL	PRB2	90
10.	COMMON /BLOCK4/A11(500),A12(500),A13(500),A21(500),A22(500),	PRB2	100
11.	1A23(500)	PRB2	110
12.	COMMON /BLOCK5/ X,Y,SINAL,COSAL,HC,M,MM1,MP1,R	PRB2	120
13.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELL(500),	PRB2	130
14.	1 SINA(500), COSA(500), XP(500), YP(500)	PRB2	140
15.	2 ,XWAKE(11),YWAKE(11)	PRB2	150
16.	COMMON /TL/ A(500), B(500), AX(500), AY(500), AZ(500),	PRB2	160
17.	1 CX(500), CY(500), CZ(500), AXV(500),AYV(500),	PRB2	170
18.	2 VN(500,5),VT(500,5),RON, IAC,	PRB2	180
19.	3 I, J, J1, SJ, DS,	PRB2	190
20.	4 DX, DY, NI, XJ, YJ,	PRB2	200
21.	5 XK, EEK, EKK, K, PF	PRB2	210
22.	COMMON /EPSBLK/ EPSLON		
23.	COMMON /PRINTF/ PRIN1,PRIN2,PRIN3	PRB2	220
24.	LOGICAL PRIN1,PRIN2,PRIN3,YSMALL	PRB2	230
25.	LOGICAL NOAXI,NOCROS,NOVORT,NOV1,NOV2,FIRSTE,LASTE	PRB2	240
26.	LOGICAL PF		
27.	DIMENSION VOAXIX(129),VOAXIY(129),VOCRSX(129),VOCRSY(129),	PRB2	250
28.	1 VOCRSZ(129),VOVORX(129),VOVORY(129),XRING(129),YRING(129)	PRB2	260
29.	DATA PI/3.1415927/	PRB2	270
30.C		PRB2	280
31.	IF (BON .GT. 0.5) GO TO 10	PRB2	290
32.C		PRB2	300
33.C	ON-BODY ...	PRB2	310
34.	X = X2(I)	PRB2	320
35.	Y = Y2(I)	PRB2	330
36.	GO TO 20	PRB2	340
37.C		PRB2	350
38.C	OFF-BODY ...	PRB2	360
39.	10 X = XP(I)	PRB2	370
40.	Y = YP(I)	PRB2	380
41.C		PRB2	390
42.	20 SINAL=SINA(J)	PRB2	400
43.	COSAL=COSA(J)	PRB2	410
44.	HC = HCURV(J)	PRB2	420
45.	M = J	PRB2	430
46.	IF (FIRSTE) M=J+1	PRB2	440
47.	IF (LASTE) M=J-1	PRB2	450
48.	MM1=M-1	PRB2	460
49.	MP1=M+1	PRB2	470
50.	IF (Y .EQ. 0.0) GO TO 30	PRB2	480
51.	DX = X - XJ	PRB2	490
52.	DY = Y - YJ	PRB2	500
53.	R = SQRT(DX**2 + DY**2)	PRB2	510
54.	IF (1 .EQ. J) R = DELL(I)/2.	PRB2	520
55.	IF ((R/Y) .GE. EPSLON) GO TO 30	PRB2	530
56.C	USE SMALL ELEMENT FORMULAE ...	PRB2	540

57.	CALL PARAB3	PRB2 550
58.	NSMALL = NSMALL + 1	PRB2 560
59.	RETURN	PRB2 570
60.C		PRB2 580
61.C		PRB2 590
62.C	BEGIN BY GENERATING THE INDUCED VELOCITIES AT THE ENDS OF NI	PRB2 600
63.C	INTERVALS (OF UNIFORM LENGTH)....	PRB2 610
64.	30 S = S0	PRB2 620
65.	DO 110 L = 1,NI	PRB2 630
66.	SSQ=S**2	PRB2 640
67.C	CALCULATE LOCAL SOURCE RADIUS, QA, AND AXIAL LOCATION, QB...	PRB2 650
68.	QA = YJ + SINL*S+HC*COSAL*SSQ	PRB2 660
69.	QB = XJ + COSAL*S-HC*SINL*SSQ	PRB2 670
70.	XRING(L) = QB	PRB2 680
71.	YRING(L) = QA	PRB2 690
72.	IF (QA .GT. 0.0) GO TO 39	
73.	VDAXIX(L) = 0.0	
74.	VDAXIY(L) = 0.0	
75.	VDCRSX(L) = 0.0	
76.	VDCRSY(L) = 0.0	
77.	VDCRSZ(L) = 0.0	
78.	VQVORX(L) = 0.0	
79.	VQVORY(L) = 0.0	
80.	GO TO 110	
81.C		
82.C	CALCULATE THE COMPLETE ELLIPTIC INTEGRALS, K(K) AND L(K),	PRB2 700
83.C	OF THE FIRST AND SECOND KINDS....	PRB2 710
84.	39 XMB=X-QB	PRB2 720
85.	XMBSQ=XMB**2	PRB2 730
86.	YMASQ=(Y-QA)**2	PRB2 740
87.	YPASQ=(Y+QA)**2	PRB2 750
88.	T1 = YPASQ + XMBSQ	PRB2 760
89.	XK= 4.*QA*Y/T1	PRB2 770
90.	CALL ELIP	PRB2 780
91.C	SUBROUTINE ELIP RETURNS THE VALUES AS EKK AND EEK.	PRB2 790
92.C		PRB2 800
93.	YSQ = Y**2	PRB2 810
94.	ASQ = QA**2	PRB2 820
95.	ROOT1 = SQRT(T1)	PRB2 830
96.	T2 = YMASQ + XMBSQ	PRB2 840
97.	T3 = XMBSQ + ASQ	PRB2 850
98.	Q1 = (-4.*EEK)/(ROOT1*T2)	PRB2 860
99.	Q2 = (2./ROOT1)*(EKK+(YSQ-ASQ-XMBSQ)*EEK/T2)	PRB2 870
100.	YSMALL = (YSQ/T3) .LT. .0001	PRB2 880
101.	IF (YSMALL) GO TO 40	PRB2 890
102.	GO TO 50	PRB2 900
103.	40 ROOT32 = (SQRT(T3))**3	PRB2 910
104.	T4 = PI*QA/ROOT32	PRB2 920
105.	T3SQ = T3**2	PRB2 930
106.C		PRB2 940
107.	50 IF (NOAXI) GO TO 70	PRB2 950
108.	IF (YSMALL) GO TO 60	PRB2 960
109.	VDAXIX(L) = Q1*QA*XMB	PRB2 970
110.	VDAXIY(L) = -Q2*QA/Y	PRB2 980
111.	GO TO 70	PRB2 990
112.	60 VDAXIX(L) = (1-2.*XMB*T4)*(1.0+0.75*YSQ*(3.0*ASQ-2.*XMBSQ)/T3SQ)	PRB21000
113.	VDAXIY(L) = -Y*T4*(2.*XMBSQ-ASQ)/T3	PRB21010

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114.C
115. 70 IF (NOCROS) GO TO 90
116. IF (YSHALL) GO TO 80
117. VDCRSX(L) = 2.*XMB / (Y*ROOT1) * (EKK - (YSQ+T3)*EEK/T2)
118. VDCRSY(L) = 2.* (1./ (YSQ*ROOT1)) * (1 - (T3)*EKK + (T3**2+YSQ*(XMB SQ-ASQ))
119. 1 *EEK/T2)
120. VDCRSZ(L) = 2.* (ROOT1/YSQ) * ((YSQ+T3)*EKK/T1 - EER)
121. GO TO 90
122. 80 VDCRSX(L) = -3.*QA*XMB*Y*T4/T3
123. VDCRSY(L) = QA*T4*(1.0-0.125*YSQ*(4.*XMB SQ-ASQ)/T3SQ)
124. VDCRSZ(L) = QA*T4*(1.0+0.375*YSQ*(ASQ-4.*XMB SQ)/T3SQ)
125.C
126. 90 IF (NOVORT) GO TO 110
127. VCVORX(L) = (ASQ-YSQ)*Q1 - Q2
128. IF (YSHALL) GO TO 100
129. VCVORY(L) = Y*XMB*Q1 + XMB*Q2/Y
130. GO TO 110
131. 100 VCVORY(L) = 0.0
132.C
133. 110 S = S + DS
134.C
135.C
136.C ASSEMBLE THE ROW OF EACH DESIRED MATRIX...
137. IF (NOAXI) GO TO 120
138. CALL SIMSON(VCAXIX,NI,DS,VDAX)
139. CALL SIMSON(VCAXIY,NI,DS,VDAY)
140. AX(J) = AX(J) + VDAX
141. AY(J) = AY(J) + VDAY
142.C
143. 120 IF (NOCROS) GO TO 130
144. CALL SIMSON(VDCRSX,NI,DS,VDCX)
145. CALL SIMSON(VDCRSY,NI,DS,VDCY)
146. CALL SIMSON(VDCRSZ,NI,DS,VDCZ)
147. CX(J) = CX(J) + VDCX
148. CY(J) = CY(J) + VDCY
149. CZ(J) = CZ(J) + VDCZ
150.C
151. 130 IF (NOVORT) GO TO 140
152. CALL SIMSON(VCVORX,NI,DS,VDVX)
153. CALL SIMSON(VCVORY,NI,DS,VDVY)
154. AXV(J) = AXV(J) + VDVX
155. AYV(J) = AYV(J) + VDVY
156.C
157.C
158. 140 CONTINUE
159.C
160.C
161. IF (.NOT. PRIN3) GO TO 150
162. WRITE (6, 260) I,J,NI,SO,DS,X,Y
163. WRITE (6, 270) (L,XRING(L),YRING(L),VCAXIX(L),VCAXIY(L),
164. 1 VDCRSX(L),VDCRSY(L),VDCRSZ(L),VCVORX(L),VCVORY(L),L=1,NI)
165. WRITE (6, 280) VCAX,VDAY,VDCX,VDCY,VDCZ,VDVX,VDVY
166.C
167.C
168. 150 IF (NOV1) GO TO 250
169. IF (NOAXI) GO TO 170
170. S = SC

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PRB21020
 PRB21030
 PRB21040
 PRB21050
 PRB21060
 PRB21070
 PRB21080
 PRB21090
 PRB21100
 PRB21110
 PRB21120
 PRB21130
 PRB21140
 PRB21150
 PRB21160
 PRB21170
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 PRB21520
 PRB21530
 PRB21540
 PRB21550
 PRB21560
 PRB21570
 PRB21580

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171.	DO 160 L = 1,NI	PRB21590
172.	VOAXIX(L) = VOAXIX(L)*S	PRB21600
173.	VOAXIY(L) = VOAXIY(L)*S	PRB21610
174.	160 S = S+DS	PRB21620
175.	CALL SIMSON (VOAXIX,NI,DS,V1AX)	PRB21630
176.	CALL SIMSON (VOAXIY,NI,DS,V1AY)	PRB21640
177.	AX(MH1) = AX(MH1) + A11(J)*V1AX	PRB21650
178.	AY(MH1) = AY(MH1) + A11(J)*V1AY	PRB21660
179.	AX(M) = AX(M) + A12(J)*V1AX	PRB21670
180.	AY(M) = AY(M) + A12(J)*V1AY	PRB21680
181.	AX(MP1) = AX(MP1) + A13(J)*V1AX	PRB21690
182.	AY(MP1) = AY(MP1) + A13(J)*V1AY	PRB21700
183.	170 IF (NOCROS) GO TO 190	PRB21710
184.	S = SQ	PRB21720
185.	DO 180 L = 1,NI	PRB21730
186.	VCCRSX(L) = VCCRSX(L)*S	PRB21740
187.	VCCRSY(L) = VCCRSY(L)*S	PRB21750
188.	VCCRSZ(L) = VCCRSZ(L)*S	PRB21760
189.	180 S = S + DS	PRB21770
190.	CALL SIMSON(VCCRSX,NI,DS,V1CX)	PRB21780
191.	CALL SIMSON(VCCRSY,NI,DS,V1CY)	PRB21790
192.	CALL SIMSON(VCCRSZ,NI,DS,V1CZ)	PRB21800
193.	CX(MH1) = CX(MH1) + A11(J)*V1CX	PRB21810
194.	CY(MH1) = CY(MH1) + A11(J)*V1CY	PRB21820
195.	CZ(MH1) = CZ(MH1) + A11(J)*V1CZ	PRB21830
196.	CX(M) = CX(M) + A12(J)*V1CX	PRB21840
197.	CY(M) = CY(M) + A12(J)*V1CY	PRB21850
198.	CZ(M) = CZ(M) + A12(J)*V1CZ	PRB21860
199.	CX(MP1) = CX(MP1) + A13(J)*V1CX	PRB21870
200.	CY(MP1) = CY(MP1) + A13(J)*V1CY	PRB21880
201.	CZ(MP1) = CZ(MP1) + A13(J)*V1CZ	PRB21890
202.	190 IF (.NOT. PRIN3) GO TO 200	PRB21900
203.	WRITE (6, 290) (L,XRING(L),YRING(L),VOAXIX(L),VOAXIY(L),VCCRSX(L),	PRB21910
204.	1, VCCRSY(L),VCCRSZ(L),L=1,NI)	PRB21920
205.	WRITE (6, 280) V1AX,V1AY,V1CX,V1CY,V1CZ	PRB21930
206.C		PRB21940
207.	200 IF (NOV2) GO TO 250	PRB21950
208.	IF (NOAXI) GO TO 220	PRB21960
209.	S = SQ	PRB21970
210.	DO 210 L = 1,NI	PRB21980
211.	VOAXIX(L) = VOAXIX(L)*S	PRB21990
212.	VOAXIY(L) = VOAXIY(L)*S	PRB22000
213.	210 S = S + DS	PRB22010
214.	CALL SIMSON (VOAXIX,NI,DS,V2AX)	PRB22020
215.	CALL SIMSON (VOAXIY,NI,DS,V2AY)	PRB22030
216.	AX(MH1) = AX(MH1) + A21(J)*V2AX	PRB22040
217.	AY(MH1) = AY(MH1) + A21(J)*V2AY	PRB22050
218.	AX(M) = AX(M) + A22(J)*V2AX	PRB22060
219.	AY(M) = AY(M) + A22(J)*V2AY	PRB22070
220.	AX(MP1) = AX(MP1) + A23(J)*V2AX	PRB22080
221.	AY(MP1) = AY(MP1) + A23(J)*V2AY	PRB22090
222.C		PRB22100
223.	220 IF (NOCROS) GO TO 240	PRB22110
224.	S = SQ	PRB22120
225.	DO 230 L = 1,NI	PRB22130
226.	VCCRSX(L) = VCCRSX(L)*S	PRB22140
227.	VCCRSY(L) = VCCRSY(L)*S	PRB22150

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228.      VDCRSZ(L) = VDCRSZ(L)*S
229. 230 S = S + DS
230.      CALL SIMSON(VDCRSX,NI,DS,V2CX)
231.      CALL SIMSON(VDCRSY,NI,DS,V2CY)
232.      CALL SIMSON(VDCRSZ,NI,DS,V2CZ)
233.      CX(MH1) = CX(MH1) + A21(J)*V2CX
234.      CY(MH1) = CY(MH1) + A21(J)*V2CY
235.      CZ(MH1) = CZ(MH1) + A21(J)*V2CZ
236.      CX(M) = CX(M) + A22(J)*V2CX
237.      CY(M) = CY(M) + A22(J)*V2CY
238.      CZ(M) = CZ(M) + A22(J)*V2CZ
239.      CX(MP1) = CX(MP1) + A23(J)*V2CX
240.      CY(MP1) = CY(MP1) + A23(J)*V2CY
241.      CZ(MP1) = CZ(MP1) + A23(J)*V2CZ
242.C
243. 240 IF (.NOT. PRIN3) GO TO 250
244.      WRITE (6, 300) (L,XRING(L),YRING(L),V2AX(L),V2AXIY(L),VDCRSX(L),
245.      1, VDCRSY(L),VDCRSZ(L),L=1,NI)
246.      WRITE (6, 280) V2AX,V2AY,V2CY,V2CY,V2CZ
247.C
248.C
249.250 IF (.NOT. PF) RETURN
250.      AX(J)=AXV(J)
251.      AY(J)=AYV(J)
252.      RETURN
253.C
254. 260 FORMAT(12HOPAPAB2. I=,I3,4H, J=,I3,5H, NI=,I3,5H, SC=,F10.5,
255.      1 5H, DS=,F10.6,7H, X(I)=,F10.5,7H, Y(I)=,F10.5)
256. 270 FORMAT(4H0 L,7X,5HXRING,8X,5HYRING,10X,6HVOAXIX,7X,6HVOAXIY,
257.      1 10X,6HVDGRSX,7X,6HVDGRSY,7X,6HVDGRSZ,10X,6HVDVORX,7X,6HVDVORY//
258.      2 (1H ,I3,2F13.5,3X,2F13.6,3X,3F13.6,3X,2F13.6))
259. 280 FORMAT(24H0RESULTS OF SIMPSON-RULE,9X,2F13.6,3X,3F13.6,3X,2F13.6,
260.      1 /1H0)
261. 290 FORMAT(4H0 L,7X,5HXRING,8X,5HYRING,10X,6HV1AXIX,7X,6HV1AXIY,
262.      1 10X,6HV1CRSX,7X,6HV1CRSY,7X,6HV1CRSZ,/(1H ,I3,2F13.5,3X,2F13.6,
263.      2 3X,3F13.6))
264. 300 FORMAT(4H0 L,7X,5HXRING,8X,5HYRING,10X,6HV2AXIX,7X,6HV2AXIY,
265.      1 10X,6HV2CRSX,7X,6HV2CRSY,7X,6HV2CRSZ,/(1H ,I3,2F13.5,3X,2F13.6,
266.      2 3X,3F13.6))
267.      END

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PRB22160
 PRB22170
 PRB22180
 PRB22190
 PRB22200
 PRB22210
 PRB22220
 PRB22230
 PRB22240
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 PRB22270
 PRB22280
 PRB22290
 PRB22300
 PRB22310
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 PRB22390
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 PRB22460
 PRB22470
 PRB22480
 PRB22490
 PRB22500
 PRB22510
 PRB22520

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SO.PRI83
1. SUBROUTINE PARAB3
2. RETURN
3. END

25 AUG 75 18

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50.PAT1			25 AUG 75	18
1.	SUBROUTINE PART1		PRT1	21
2.C			PRT1	10
3.C	OVERLAY (PAN,1,0)			C
4.C	PROGRAM PART1			C
5.C			PRT1	30
6.C	* CONTROL FOR BASIC DATA AND FORM MATRIX		PRT1	40
7.C			PRT1	50
8.	COMMON / NBSAVE / NBOLD, NIN		PRT1	60
9.	COMMON HEDR(10), CASE, NB, NNU		PRT1	70
10.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		PRT1	80
11.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		PRT1	90
12.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		PRT1	100
13.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		PRT1	110
14.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		PRT1	120
15.	COMMON NT, ND(11), MN, NUNA(5), TYPEA(5),		PRT1	130
16.	1 NER1, NER2, NMA, NSIGA, NSIGC,		PRT1	140
17.	2 NUNC(5), TYPEC(5), NLF(11), IEC, NSIGEC,		PRT1	150
18.	3 TYPEEC(5), NUNCC(5)		PRT1	160
19.	DOUBLE PRECISION HEDR, CASE		PRT1	170
20.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		PRT1	180
21.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		PRT1	190
22.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		PRT1	200
23.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		PRT1	210
24.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		PRT1	220
25.	COMMON /IPSF/ PSF		PRT1	230
26.	COMMON /P/ IPUVEL		PRT1	240
27.	REAL MN		PRT1	250
28.C			PRT1	260
29.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELS(500),		PRT1	270
30.	1 SINAI(500), COSA(500), XP(500), YP(500)		PRT1	280
31.	2 ,XWAKE(11), YWAKE(11)		PRT1	290
32.	COMMON /TL/ TX1(500), TY1(500), NG(500), TG(500), ALFA(500),		PRT1	300
33.	1 RSOS(500), DALF(500),		PRT1	310
34.	2 CHORD, TEMP(600), TCNST, DUMMY(5915)		PRT1	320
35.	COMMON /PRINT/ PRIN1, PRIN2, PRIN3		PRT1	330
36.	COMMON /BLOCKR/ NRAKES, RNAME(20,9), RAKEA(20), RUNITX(20),		PRT1	340
37.	1 RUNITY(20), RDS(20), NRPTS(20), COSTH(20), IRAKE, NOFF, X1R(20),		PRT1	350
38.	2 Y1R(20), X2R(20), Y2R(20)		PRT1	360
39.	COMMON /EPSBLK/ EPSLON			
40.	COMMON /RNGWNG/ VA(500,2), VR(500,2), VAN(500), VAT(500)		MTRX	350
41.	COMMON /BLOCK1/ IGEDMF(9), ISIGF(9), IPNCHF, NONEW(9)		BAS1	70
42.	COMMON /BLOCK2/ HCURV(500), HARC(500)		BAS1	80
43.	COMMON /BLOCK3/ NOAX1, NOCRDS, NOVORT, NOV1, NOV2, FIRSTE, LASTE, LSSE, SD, XY22			430
44.	1 NSHALL		XY22	440
45.	COMMON /BLOCK4/ A11(500), A12(500), A13(500), A21(500), A22(500),		MTRX	90
46.	1A23(500)		MTRX	100
47.	LOGICAL PRIN1, PRIN2, PRIN3		PRT1	370
48.	INTEGER BDN ,SUBKS		PRT1	380
49.	REAL MX ,MY ,NG		PRT1	390
50.C			PRT1	400
51.C	* START		PRT1	410
52.C	* READ INPUT DATA		PRT1	420
53.	10 READ (5, 50, END= 590) HEDR, CASE, PSF, NB, NNU, FLG03, FLG04, FLG05, FLG06, FLG07, FLG08, FLG09, FLG10, FLG11, FLG12, FLG13, FLG14,		PRT1	431
54.C	10 READ (5, 50) HEDR, CASE, PSF, NB, NNU, FLG03, FLG04, FLG05, FLG06, FLG07, FLG08, FLG09, FLG10, FLG11, FLG12, FLG13, FLG14,		PRT1	43C
55.	106, FLG07, FLG08, FLG09, FLG10, FLG11, FLG12, FLG13, FLG14,		PRT1	440
56.	2FLG14, FLG15, FLG16, FLG17, FLG18, FLG19, FLG20, FLG21, FLG22, FLG23, FLG24, FLG25, FLG26, FLG27		PRT1	450

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57.      3FLG22,          FLG23, FLG24, FLG25, FLG26, FLG27, IPUVEL, NIN,IPR1 460
58.      4RIN1, IPRIN2,IPRIN3,IRAKF          PRT1 470
59.      IPUVEL=1
60.C      IF (EOF(5)) 590,1)
61.      11 CONTINUE
62.      PRIN1 = .FALSE.          PRT1 480
63.      IF (IPRIN1 .EQ. 1) PRIN1 = .TRUE.          PRT1 490
64.      PRIN2 = .FALSE.          PRT1 500
65.      IF (IPRIN2 .EQ. 1) PRIN2 = .TRUE.          PRT1 510
66.      PRIN3 = .FALSE.          PRT1 520
67.      IF (IPRIN3 .EQ. 1) PRIN3 = .TRUE.          PRT1 530
68.C*** **TRIANGULARIZATION OF THE MATRIX (SOLVIT) IS THE DEFAULT SOLUTIONPRT1 540
69.      IF (FLG09.EQ.0.AND.FLG10.EQ.0)FLG13=1          PRT1 550
70.C*** ***FLG22 IS GENERATED (RESEP) BOUNDARY CONDITIONS          PRT1 560
71.C*** ***FLG21 IS EXTRA CROSS FLOW          PRT1 570
72.      IF (FLG22.LE.0)GO TO 20          PRT1 580
73.      FLG21 = 1          PRT1 590
74.      FLG03 = 1          PRT1 600
75.      FLG04 = 1          PRT1 610
76.C*** ***IF FLAG 12 IS NOT EQUAL TO FLAG 14 YOU MUST USE DIRECT MATRIXPRT1 620
77.      20 IF (FLG18.NE.FLG14)GO TO 30          PRT1 630
78.      IF (FLG21.LE.0)GO TO 40          PRT1 640
79.      FLG12 = 1          PRT1 650
80.      30 FLG13 = 1          PRT1 660
81.      FLG09 = 0          PRT1 670
82.      FLG10 = 0          PRT1 680
83.      40 CONTINUE          PRT1 690
84.      IF (NBOLD .EQ. 0)          NBOLD = NB          PRT1 700
85.C*** **CARDS (UNIT 5) ARE THE DEFAULT METHOD OF INPUT          PRT1 710
86.      IF (NIN .EQ. 0)          NIN = 5          PRT1 720
87.      50 FORMAT ( 10A6, 3X A6, 7X A4/ 20I1, 12,4I1)
88.      READ (5, 60) CHORD, MN, TCNST, EPSLON          PRT1 740
89.      60 FORMAT ( 4F10.0 )          PRT1 750
90.C*** **THE DEFAULT CHORD LENGTH IS 1.0          PRT1 760
91.      IF (CHORD.GT.-1.0E-5.AND.CHORD.LT.1.0E-5)CHORD=1.0          PRT1 770
92.      WRITE (6, 70) HCDR, CASE, NB, NNU, CHORD, MN, TCNST, EPSLON, PSF          PRT1 780
93.      70 FORMAT ( 1H1 25X, 26HDOUGLAS AIRCRAFT COMPANY /          PRT1 790
94.      1          28X, 21HLONG REACH DIVISION ///          PRT1 800
95.      2 6X,52HPROGRAM EQDF -- PARABOLIC AXISYMMETRIC AND CROSSFLOW ,//          PRT1 810
96.      3          11X, 29H***** CASE CONTROL DATA ***** ///          PRT1 820
97.      4          6X, 10A6, 4X, 10HCASE NO. A6 //          PRT1 830
98.      5          6X 9HBODIES =I3/ 6X 9HNNU =I3/ 6X 9HCHORD =F12.7/PRT1 840
99.      6          6X 9HMACH NO.=F12.8/ 6X 9HTCNST =F12.7/          PRT1 850
100.      7          6X,8HEPSLON =,F12.7,/6X,9HPSF NO. =, A4///)
101.      IF (FLG03.GT.0) WRITE (6, 80)          PRT1 870
102.      80 FORMAT (13X 21HSURFACE OF REVOLUTION )          PRT1 880
103.      IF (FLG04.GT.0) WRITE (6, 90)          PRT1 890
104.      90 FORMAT (13X 9HCROSSFLOW)          PRT1 900
105.      IF (FLG05.GT.0) WRITE (6, 100)          PRT1 910
106.      100 FORMAT (13X 15HOFF-BODY POINTS )          PRT1 920
107.      IF (FLG06.GT.0) WRITE (6, 110)          PRT1 930
108.      110 FORMAT (13X 15HBASIC DATA ONLY )          PRT1 940
109.      IF (FLG07.GT.0) WRITE (6, 120)          PRT1 950
110.      120 FORMAT (13X 17HELLIPSE GENERATOR )          PRT1 960
111.      IF (FLG08.GT.0) WRITE (6, 130)          PRT1 970
112.      130 FORMAT (13X 14HPRINT MATRICES )          PRT1 980
113.      IF (FLG09.GT.0) WRITE (6, 140)          PRT1 990

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114.	140	FORMAT (13X 10HOLD SETDEL)	PRT11000
115.		IF (FLG10.GT.0) WRITE (6, 150)	PRT11010
116.	150	FORMAT(13X,31HMODIFIED SETOLL MATRIX SOLUTION)	PRT11020
117.		IF (FLG11.GT.0) WRITE (6, 160)	PRT11030
118.	160	FORMAT (13X 18HPERTURBATIONS ONLY)	PRT11040
119.		IF (FLG12.GT.0) WRITE (6, 170)	PRT11050
120.	170	FORMAT (13X 22HSOLVE POTENTIAL MATRIX)	PRT11060
121.		IF (FLG13.GT.0) WRITE (6, 180)	PRT11070
122.	180	FORMAT (13X 47HMATRIX SOLUTION BY TRIANGULARIZATION (SOLVIT))	PRT11080
123.		IF (FLG14.GT.0) WRITE (6, 190)	PRT11090
124.	190	FORMAT (13X 30HPRESCRIBED TANGENTIAL VELOCITY)	PRT11100
125.		IF (FLG18.GT.0) WRITE (6, 200)	PRT11110
126.	200	FORMAT (15X 22HWITH SURFACE VORTICITY)	PRT11120
127.		IF (FLG15.GT.0) WRITE (6, 210)	PRT11130
128.	210	FORMAT (13X 12HSTRIP VORTEX)	PRT11140
129.		IF (FLG16.GT.0) WRITE (6, 220)	PRT11150
130.	220	FORMAT (13X 4CHOMIT AXI-SYMMETRIC UNIFORM FLOW SOLUTION)	PRT11160
131.		IF (FLG17.GT.0) WRITE (6, 230)	PRT11170
132.	230	FORMAT (13X 36HOMIT CROSSFLOW UNIFORM FLOW SOLUTION)	PRT11180
133.		IF (FLG19.GT.0) WRITE (6, 240)	PRT11190
134.	240	FORMAT (13X 20HPRESCRIBED VORTICITY)	PRT11200
135.		IF (FLG20 .GT. 0)WRITE(6, 250)	PRT11210
136.	250	FORMAT(13X 15HTOTAL VORTICITY)	PRT11220
137.		IF (FLG21 .GT. 0)WRITE(6, 260)	PRT11230
138.	260	FORMAT (13X 16Hextra CROSS FLOW)	PRT11240
139.		IF (FLG22 .GT. 0)WRITE(6, 270)	PRT11250
140.	270	FORMAT(13X 82HGENERATED BOUNDARY CONDITIONS FOR 3 AXISYMMETRIC, 1	PRT11260
141.		1CROSS, AND 1 EXTRA CROSS FLOW.)	PRT11270
142.		IF (FLG23 .LE. 0)GO TO 290	PRT11280
143.		WRITE(6, 280)	PRT11290
144.	280	FORMAT(13X 16HRING WING OPTION)	PRT11300
145.		FLG03 = 1	PRT11310
146.		FLG13 = 1	PRT11320
147.		FLG15 = 1	PRT11330
148.		FLG19 = 1	PRT11340
149.	290	IF (FLG19 .GT. 0)FLG18 = 1	PRT11350
150.		IF (FLG22.GT.0.AND.NB.NE.2) GO TO 300	PRT11360
151.		GO TO 320	PRT11370
152.	300	WRITE(6, 310)	PRT11380
153.	310	FORMAT (128H0 WHEN GENERATED RESEP BOUNDARY CONDITIONS ARE USED,NUPRT11390	
154.		1MBER OF BODIES MUST BE EXACTLY TWO. YOU GOOFED. EXECUTION TERM	PRT11400
155.		2INATING.)	PRT11410
156.		STOP	PRT11420
157.	320	IF (FLG22.GT.0.AND.NNU.GT.0)GO TO 330	PRT11430
158.		GO TO 350	PRT11440
159.	330	WRITE (6, 340)	PRT11450
160.	340	FORMAT (98HC GENERATED RESEP BOUNDARY CONDITIONS CANNOT HAVE NON-UPRT11460	
161.		INIFORM FLOW INPUT. EXECUTION TERMINATING.)	PRT11470
162.	350	IF (1PUVEL.NE.C)WRITE (6, 360)	PRT11480
163.	360	FORMAT (13X 14HPUNCHED OUTPUT)	PRT11490
164.		WRITE (6, 370) NIN	PRT11500
165.		IF (FLG18.LE.0.OR.FLG14.GT.0) GO TO 390	PRT11510
166.	370	FORMAT(13X,58HINPUT TAPE NO. FOR COORDINATES AND NON-UNIFORM FLOPR11520	
167.		1W ONLY = , 15)	PRT11530
168.		WRITE (6, 380)	PRT11540
169.	380	FORMAT (140//63H FLG14 MUST BE USED WITH FLG18 OR FLG19. EXECUTIO	PRT11550
170.		1N TERMINATED.)	PRT11560

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171. STOP PRT11570
172. 390 IF (NNU.LE.0.OR.FLG14.LE.0) GO TO 410 PRT11580
173. WRITE (6, 400 ) PRT11590
174. 400 FORMAT (1H// 49H COLUMNS 2 AND 14 OF FLAG CARD ARE BOTH NON-ZERO. PRT11600
175. 1 / 43H ILLEGAL COMBINATION. EXECUTION TERMINATED. ) PRT11610
176. STOP PRT11620
177.C * READ DATA AND SETUP FOR UNIFORM FLOW PRT11630
178. 410 IF (IRAKE.CO. 1) WRITE (6, 600 ) PRT11640
179. CALL BASIC1 PRT11650
180.C*** **NSIGA AND NSIGC ULTIMATELY BECOME THE NUMBER OR RIGHT HAND SIDES PRT11660
181.C*** **IN AXISYMMETRIC FLOW AND CROSS FLOW RESPECTIVELY PRT11670
182. NSIGA=0 PRT11680
183. IF (FLG03.GT.0.AND.FLG16.LE.0) NSIGA=1 PRT11690
184. NSIGC=0 PRT11700
185. IF (FLG04.GT.0.AND.FLG17.LE.0) NSIGC=1 PRT11710
186. IF (FLG22.GT.0) GO TO 430 PRT11720
187. DO 420 I = 1,5 PRT11730
188. NUNA(I) = 123456 PRT11740
189. 420 TYPEA(I) = 100. PRT11750
190. IF (FLG23.GT.0) GO TO 450 PRT11760
191. GO TO 480 PRT11770
192.C*** **PREPARE NUNA AND TYPEA FOR NON-UNIFORM AXISYMMETRIC FLOW, GENER PRT11780
193.C*** **((RESE) BOUNDARY CONDITIONS PRT11790
194. 430 DO 440 I = 1,3 PRT11800
195. NUNA(I) = 1 PRT11810
196. 440 TYPEA(I) = 100.0 PRT11820
197. GO TO 480 PRT11830
198.C PRT11840
199.C PRT11850
200.C *** RING WING OPTION PRT11860
201.C *** STRIP VORTEX FLOWS ALREADY HAVE NUNA(I) = 123456. PRT11870
202.C *** MAKE PRESCRIBED VORTICITY FLOWS NUNA(J) = TO THEIR FLOW NO. J PRT11880
203.C PRT11890
204. 450 ICNT = 0 PRT11900
205. DO 460 I = 1,NB PRT11910
206. IF (NLF(I).GT.0) GO TO 460 PRT11920
207. ICNT = ICNT + 1 PRT11930
208. 460 CONTINUE PRT11940
209.C PRT11950
210.C *** ICNT IS THE NUMBER OF LIFTING BODIES PRT11960
211.C *** NUMBER OF FLOWS IS 2 * ICNT + 1 PRT11970
212.C PRT11980
213. NFlows = 2 * ICNT + 1 PRT11990
214. ICNTP2 = ICNT * 2 PRT12000
215. DO 470 I = ICNTP2,NFlows PRT12010
216. 470 NUNA(I) = 1 PRT12020
217. 480 CONTINUE PRT12030
218.C*** **IF FLG02 (NON-UNIFORM FLOW) IS NOT CHECKED INITIALLY, THE FLOW PRT12040
219.C*** **OF CONTROL WILL NEVER REACH BASIC2 PRT12050
220. IF (NNU) 490 , 500 , 490 PRT12060
221.C * READ DATA AND SETUP FOR NON-UNIFORM FLOW PRT12070
222. 490 CALL BASIC2 PRT12080
223. 500 CONTINUE PRT12090
224. REWIND 4 PRT12100
225. IF (NSIGA.LE.5) GO TO 530 PRT12110
226. 510 WRITE (6, 520 ) PRT12120
227. 520 FORMAT (1H1 75HAXI-SYMMETRIC OR CROSSFLOW NON-UNIFORM FLOWS EXCEED PRT12130

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228.	1 5. EXECUTION TERMINATED	PRT12140
229.	STOP	PRT12150
230.	530 IF (NS)6C .GT. 5)GO TO 510	PRT12160
231.	IF (FLG15.LE.0.OR.FLG03.GT.0) GO TO 550	PRT12170
232.	WRITE (6, 540)	PRT12180
233.	540 FORMAT (64H)STRIP RING VORTEX OPTION MUST USE SURFACE OF REVOLUTION	PRT12190
234.	IN OPTION. / 22H EXECUTION TERMINATED.)	PRT12200
235.	STOP	PRT12210
236.	550 IF (FLG15.LE.0) GO TO 580	PRT12220
237.	J = 0	PRT12230
238.	DO 560 I = 1, NB	PRT12240
239.	560 IF (NLF(I).LE.0) J=J+1	PRT12250
240.	IF (NSIGA + J) .LE. 5)GO TO 580	PRT12260
241.	WRITE (6, 570)	PRT12270
242.	570 FORMAT (68H)GENERATED STRIP VORTEX ONSET FLOWS (ONE FOR EACH LIFT	PRT12280
243.	ING BODY) PLUS / 34H INPUT NON-UNIFORM FLOWS EXCEED 5. /	PRT12290
244.	2 22H EXECUTION TERMINATED.)	PRT12300
245.	STOP	PRT12310
246.	580 IF (FLG06.NE.0) GO TO 10	PRT12320
247.	CALL MATRIX	PRT12330
248.	GO TO 595	PRT12340
249.	590 WRITE (6, 610)	PRT12350
250.	STOP	PRT12360
251.	595 RETURN	I
252.C	595 CONTINUE	C
253.	600 FORMAT(13X,'AUTOMATIC RAKE GENERATION')	PRT12370
254.	610 FORMAT(55H)NO ADDITIONAL CASES INPUT. NORMAL PROGRAM TERMINATION.)	PRT12380
255.	END	PRT12390

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50.PAT2			25 AUG 75	18
1.	SUBROUTINE PART2		PRT2	21
2.C			PRT2	10
3.C	OVERLAY (PAN,2,0)			C
4.C	PROGRAM PART2			C
5.C			PRT2	30
6.C	* COMPUTE SOURCE DENSITY SIGMA BY SIEDEL ITERATION		PRT2	40
7.C			PRT2	50
8.	COMMON HEDR(10) ,CASE ,NB ,NNU		PRT2	60
9.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		PRT2	70
10.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		PRT2	80
11.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		PRT2	90
12.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		PRT2	100
13.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		PRT2	110
14.	COMMON NT, ND(11), MN, NUNA(5), TYPEA(5),		PRT2	120
15.	1 NER1, NER2, NMA, NSIGA, NSIGC,		PRT2	130
16.	2 NUMC(5), TYPEC(5), NLF(11), TEC, NSIGEC,		PRT2	140
17.	3 TYPEFC(5),NUNEC(5)		PRT2	150
18.	DOUBLE PRECISION HEDR, CASE		PRT2	160
19.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07		PRT2	170
20.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12		PRT2	180
21.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17		PRT2	190
22.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22		PRT2	200
23.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27		PRT2	210
24.	REAL HN		PRT2	220
25.C			PRT2	230
26.	COMMON /C2/ A(500), R(500,4), NSIG, IT		PRT2	240
27.C			PRT2	250
28.	DIMENSION ASIG(500,4), CSIG(500,4), T(500)		PRT2	260
29.C			PRT2	270
30.C	* START		PRT2	280
31.	IF (FLG03.EQ.0) GO TO 80		PRT2	290
32.C	* AXIS FLOW		PRT2	300
33.	L=0		PRT2	310
34.	READ (4) (T(I),I=1,NT)		PRT2	320
35.	IF (FLG16.NE.0) GO TO 20		PRT2	330
36.	L=L+1		PRT2	340
37.	DO 10 I = 1, NT		PRT2	350
38.	10 R(I,L) = T(I)		PRT2	360
39.	20 IF (NNU) 60 , 60 , 30		PRT2	370
40.	30 DO 50 J = 1, NNU		PRT2	380
41.C	* READ NON-UNIFORM ND * SKIP TO		PRT2	390
42.	READ (4) MS,(T(I),I=1,NT)		PRT2	400
43.	IF (MS.EQ.1) GO TO 50		PRT2	410
44.	L=L+1		PRT2	420
45.	DO 40 I = 1, NT		PRT2	430
46.	40 R(I,L) = T(I)		PRT2	440
47.	50 CONTINUE		PRT2	450
48.	60 REWIND 4		PRT2	460
49.	IT = 9		PRT2	470
50.	NSIG = NSIGA		PRT2	480
51.C	* SOLVE SIMULTANEOUS EQUATIONS FOR SIGMAS		PRT2	490
52.	CALL HISNA2 (ASIG)		PRT2	500
53.	REWIND 9		PRT2	510
54.	IF (FLG04.GT.0) GO TO 80		PRT2	520
55.C	* WRITE SIGMAS ON TAPE 3		PRT2	530
56.	DO 70 J = 1, NSIGA		PRT2	540

57.	70	WRITE (3) (ASIG(I,J), I = 1, NT)	PRT2 550
58.		GO TO 180	PRT2 560
59.C		* CROSS FLOW	PRT2 570
60.	80	L = D	PRT2 580
61.		READ (4) (T(I),I=1,NT), (T(I),I=1,NT)	PRT2 590
62.		IF (FLG17.NE.0) GO TO 100	PRT2 600
63.		L = L+1	PRT2 610
64.		DO 90 I = 1, NT	PRT2 620
65.	90	R(I,L) = -T(I)	PRT2 630
66.	100	IF (NNU) 140, 140, 110	PRT2 640
67.	110	DO 130 J = 1, NNU	PRT2 650
68.		READ (4) MS, (T(I),I=1,NT)	PRT2 660
69.		IF (MS.LE.0) GO TO 130	PRT2 670
70.		L = L+1	PRT2 680
71.		DO 120 J = 1, NT	PRT2 690
72.	120	R(I,L) = T(I)	PRT2 700
73.	130	CONTINUE	PRT2 710
74.	140	REWIND 4	PRT2 720
75.		IT = 10	PRT2 730
76.		NSIG = NSIGC	PRT2 740
77.C		* SOLVE SIMULTANEOUS EQUATIONS FOR SIGMAS	PRT2 750
78.		CALL HISNA2 (CSIG)	PRT2 760
79.		REWIND 10	PRT2 770
80.		IF (FLG03.LE.0) GO TO 160	PRT2 780
81.C		* WRITE SIGMAS ON TAPE 3	PRT2 790
82.		DO 150 J = 1, NSIGA	PRT2 800
83.	150	WRITE (3) (ASIG(I,J),I=1,NT)	PRT2 810
84.	160	DO 170 J = 1, NSIGC	PRT2 820
85.	170	WRITE (3) (CSIG(I,J),I=1,NT)	PRT2 830
86.	180	RETURN	PRT2 840
87.C	180	CONTINUE	C
88.		END	PRT2 850

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50.PAT4							08 DEC 75	14
1.	SUBROUTINE PART4						PRT4	21
2.C							PRT4	10
3.C	OVERLAY (PAN,4,0)							C
4.C	PROGRAM PART4							C
5.C							PRT4	30
6.C	* COMPUTE VELOCITY COMPONENTS AND PRINT						PRT4	40
7.C							PRT4	50
8.	COMMON /BLOCK2/ HCURV(500),HAPC(500)							
9.	COMMON/CURVPR/ IEL2							
10.	COMMON HEDR(10),CASE,NB,NNU						PRT4	60
11.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07						PRT4	70
12.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12						PRT4	80
13.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17						PRT4	90
14.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22						PRT4	100
15.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27						PRT4	110
16.	COMMON NT, NO(11), MN, NUNA(5), TYPEA(5),						PRT4	120
17.	1 NER1, NER2, NMA, NSIGA, NSIGC,						PRT4	130
18.	2 NUNC(5), TYPEC(5), NLF(11), IEC, NSIGEC,						PRT4	140
19.	3 YYPEEC(5),NUNEC(5)						PRT4	150
20.	DOUBLE PRECISION HEDR, CASE						PRT4	160
21.	COMMON /COMBIN/CHAY(2)						PRT4	170
22.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07						PRT4	180
23.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12						PRT4	190
24.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17						PRT4	200
25.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22						PRT4	210
26.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27						PRT4	220
27.	REAL MN						PRT4	230
28.C							PRT4	240
29.	COMMON /C4/ X1(500), Y1(500), X2(500), Y2(500), DELS(500),						PRT4	250
30.	1 SINA(500),COSA(500),XP(500), YP(500)						PRT4	260
31.	COMMON /TC/ RB(500,10), SIG(500,5), A(500), B(500),						PRT4	270
32.	1 Z(500), PHT(500,5), XN(500,5), T(500,5),						PRT4	280
33.	2 T3(500,5), NSIG, NP, NI,						PRT4	290
34.	3 SUMV, SUMH(5)						PRT4	300
35.C							PRT4	310
36.C	* START						PRT4	320
37.	DO 10 J = 1,10						PRT4	330
38.	DO 10 I = 1,500						PRT4	340
39.	10 RB(I,J) = 0.0						PRT4	350
40.	REWIND 3						PRT4	360
41.	IF (FLG05.EQ.0) GO TO 20						PRT4	370
42.C	* READ OFF-BODY XP,YP						PRT4	380
43.	NP=ND(NB+1)						PRT4	390
44.	READ (12) (XP(I),I=1,NP),(YP(I),I=1,NP)						PRT4	400
45.C	* READ X1,Y1,X2,Y2,DELS WITH MACH NO. ADJUSTMENT IF ANY						PRT4	410
46.	20 NI=NT+NB						PRT4	420
47.	READ (12) (X1(I),I=1,NI),(Y1(I),I=1,NI),(X2(I),I=1,NI)						PRT4	430
48.	1 (Y2(I),I=1,NI),(DELS(I),I=1,NI)						PRT4	440
49.C	* READ SINA,COSA,NO,T0..						PRT4	450
50.	READ (4) (A(I),I=1,NT),(B(I),I=1,NT)						PRT4	460
51.	NMAP1 = NMA + 1						PRT4	470
52.	IF(FLG23 .GT. 0) READ(4) (Z(I),I=NMAP1,NT)						PRT4	480
53.	SUMV = 0.0						PRT4	490
54.	DO 30 I = 1, NT						PRT4	500
55.	SINA(I) = A(I)						PRT4	510
56.	COSA(I) = B(I)						PRT4	520

57.	30	SUMV = SUMV + B(I)*DELS(I)*Y2(I)**2	PRT4	530
58.		SUMV = SUMV+3.141593	PRT4	540
59.		IF (FLG03.LE.0) GO TO 110	PRT4	550
60.		L = 1	PRT4	560
61.		LS = 0	PRT4	570
62.		IF (FLG16.NE.C) GO TO 50	PRT4	580
63.		DO 40 I = 1, NT	PRT4	590
64.		RB(I,L) = A(I)	PRT4	600
65.	40	RB(I,L+1) = B(I)	PRT4	610
66.	50	IF (NNU) 100 , 100 , 60	PRT4	620
67.	60	DO 80 J = 1, NNU	PRT4	630
68.		READ (4) MS,(A(I),I=1,NT),(B(I),I=1,NT)	PRT4	640
69.		IF (MS.EQ.1.OR.MS.EQ.2.OR.MS.EQ.5) GO TO 80	PRT4	650
70.		L = L+2	PRT4	660
71.		LS = LS+1	PRT4	670
72.		IF (LS.EQ.1.AND.FLG16.GT.0) L=L-2	PRT4	680
73.		DO 70 I = 1, NT	PRT4	690
74.		RB(I,L) = A(I)	PRT4	700
75.	70	RB(I,L+1) = B(I)	PRT4	710
76.	80	CONTINUE	PRT4	720
77.		IF (FLG23 .LE. C) GO TO 100	PRT4	730
78.		IPV = NB - FLG14 + 1	PRT4	740
79.		NN = NMA	PRT4	750
80.		DO 90 KCNT = IPV,NB	PRT4	760
81.		L = L + 2	PRT4	770
82.		NN = NN + ND(KCNT) - 1	PRT4	780
83.C		*** READ NOTS COLUMNS OF RHS	PRT4	790
84.		READ(4)(RB(I,L),I=1,NT),(RB(I,L+1),I=1,NT)	PRT4	800
85.C		*** MULTIPLY NOTS COLUMN BY LAST INPUT PV ON THAT BODY	PRT4	810
86.		DO 80 I=1,NT	PRT4	820
87.		RB(I,L) = RB(I,L) * Z(NN)	PRT4	830
88.	90	RB(I,L+1) = RB(I,L+1) * Z(NN)	PRT4	840
89.	100	REWIND 4	PRT4	850
90.		NSIG = NSIGA	PRT4	860
91.		IF (FLG23 .GT. 0) NSIG = 2.0 * NSIG - 1	PRT4	870
92.		CALL AXIS	PRT4	880
93.	110	IF (FLG04.LE.0) GO TO 120	PRT4	890
94.		IF (FLG03.LE.0) GO TO 120	PRT4	900
95.		READ (4) (A(I),I=1,NT),(B(I),I=1,NT)	PRT4	910
96.	120	L = 1	PRT4	920
97.		LS=0	PRT4	930
98.		IF (FLG17.NE.C) GO TO 140	PRT4	940
99.		DO 130 I = 1, NT	PRT4	950
100.		RB(I,L) = A(I)	PRT4	960
101.	130	RB(I,L+1) = B(I)	PRT4	970
102.	140	IF (NNU) 180 , 180 , 150	PRT4	980
103.	150	DO 170 J = 1, NNU	PRT4	990
104.		READ (4) MS,(A(I),I=1,NT),(B(I),I=1,NT)	PRT4	1000
105.		IF (MS.EQ.0.OR.MS.EQ.2.OR.MS.EQ.4) GO TO 170	PRT4	1010
106.		L = L+2	PRT4	1020
107.		LS=LS+1	PRT4	1030
108.		IF (LS.EQ.1.AND.FLG17.GT.0) L=L-2	PRT4	1040
109.		DO 160 I = 1, NT	PRT4	1050
110.		RB(I,L) = A(I)	PRT4	1060
111.	160	RB(I,L+1) = B(I)	PRT4	1070
112.	170	CONTINUE	PRT4	1080
113.	180	REWIND 4	PRT4	1090

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114.	NSIG = NSTGC	PRT41100
115.	CALL CROSS	PRT41110
116.	190 IF (FLG21 .LE. 0) GO TO 220	PRT41120
117.	REWIND 4	PRT41130
118.	IF (FLG22.GT.0) GO TO 210	PRT41140
119.	L = 0	PRT41150
120.C***	***IF CONTROL REACHES THIS POINT, THERE IS AT LEAST 1 NNU	PRT41160
121.C***	***SKIP RECORD WITH SIN AND COS	PRT41170
122.	READ (4)	PRT41180
123.	DO 200 J,= 1,NNU	PRT41190
124.	READ(4) HS, (A(I),I=1,NT), (P(I),I=1,NT)	PRT41200
125.	L = L + 1	PRT41210
126.	DO 200 I = 1,NT	PRT41220
127.	RB(I,L) = A(I)	PRT41230
128.	200 RB(I,L+1) = B(I)	PRT41240
129.	210 REWIND 4	PRT41250
130.	NSIG = NSIGFC	PRT41260
131.C***	***CALL TO EXCROS FOR GENERATED (PESEP) BOUNDARY CONDITIONS	PRT41270
132.	CALL EXCROS	PRT41280
133.220	WRITE(7,231) IEL2	
134.231	FORMAT(I8)	
135.	WRITE(7,230) (HCUFV(II),II=1,IEL2)	
136.230	FORMAT(4E13.8)	
137.	RETURN	
138.C 220	CONTINUE	C
139.	END	PRT41300

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50.PREP							25 AUG 75	18
1.	SUBROUTINE	PREP					PREP	21
2.C							PREP	10
3.C	OVERLAY	(PAN,3,0)						C
4.C	PROGRAM	PREP						C
5.C **		* PREPARE TAPES 3 AND 11 FOR USE BY LINK 5 (HATSOL)					PREP	30
6.	COMMON/SPACER/WKAREA	(16000)					PREP	40
7.	DIMENSION	TEMP(505), Y2(500)					PREP	50
8.	COMMON	HEDR(10), CASE, NB, NNU					PREP	60
9.	1	,FLG03, FLG04, FLG05, FLG06, FLG07					PREP	70
10.	2	,FLG08, FLG09, FLG10, FLG11, FLG12					PREP	80
11.	3	,FLG13, FLG14, FLG15, FLG16, FLG17					PREP	90
12.	4	,FLG18, FLG19, FLG20, FLG21, FLG22					PREP	100
13.	5	,FLG23, FLG24, FLG25, FLG26, FLG27					PREP	110
14.	COMMON	NT, ND(11), MN, NUNA(5), TYPECA(5),					PREP	120
15.	1	NER1, NER2, NMA, NSIGA, NSIGC,					PREP	130
16.	2	NUNC(5), TYPEC(5), NLF(11), JEC, NSIGFC,					PREP	140
17.	3	TYPEEC(5), NUNEC(5)					PREP	150
18.	DOUBLE PRECISION	HEDR, CASE					PREP	160
19.	INTEGER	FLG03, FLG04, FLG05, FLG06, FLG07					PREP	170
20.	1	,FLG08, FLG09, FLG10, FLG11, FLG12					PREP	180
21.	2	,FLG13, FLG14, FLG15, FLG16, FLG17					PREP	190
22.	3	,FLG18, FLG19, FLG20, FLG21, FLG22					PREP	200
23.	4	,FLG23, FLG24, FLG25, FLG26, FLG27					PREP	210
24.	REAL	MN					PREP	220
25.	DIMENSION	COSSOR(500), RMS(500)					PREP	230
26.	DIMENSION	A(505), R(500,5), FF(500), Y(500)					PREP	240
27.	DATA	FOURPI/12.5663706/					PREP	250
28.C***	***AXISYMMETRIC FLOW ONLY	MS = 0					PREP	260
29.C***	***CROSS FLOW ONLY	MS = 1					PREP	270
30.C***	***EXTRA CROSS FLOW ONLY	MS = 2					PREP	280
31.C***	***AXISYMMETRIC AND CROSS FLOW	MS = 3					PREP	290
32.C***	***AXISYMMETRIC AND EXTRA CROSS FLOW	MS = 4					PREP	300
33.C***	***CROSS AND EXTRA CROSS FLOW	MS = 5					PREP	310
34.C***	***AXISYMMETRIC, CROSS, AND EXTRA CROSS FLOW	MS = 6					PREP	320
35.	IF (FLG12.EQ.0.OR.(FLG04.EQ.0.AND.FLG21.EQ.0))	GO TO 20					PREP	330
36.	IF (FLG05.EQ.0)	GO TO 10					PREP	340
37.C***	***SKIP OFF BODY COORDINATES						PREP	350
38.	READ(12)						PREP	360
39.	10	NI=NT+NB					PREP	370
40.	READ(12)	(TEMP(I),I = 1,NI), (TEMP(I),I = 1,NI),					PREP	380
41.	1	(TEMP(I),I = 1,NT), (Y2(I),I = 1,NT)					PREP	390
42.	REWIND	12					PREP	400
43.	20	REWIND 3					PREP	410
44.	IF (FLG03)	30, 230, 30					PREP	420
45.C **		* PREPARE AXISYMMETRIC MATRIX TAPE (3)					PREP	430
46.	30	IF (FLG19.GT.0) GO TO 530					PREP	440
47.	IF (FLG22.GT.0)	GO TO 140					PREP	450
48.	K = 0						PREP	460
49.	L = NT+NSIGA						PREP	470
50.	READ (4)	(A(I),I=1,NT), (FF(I),I=1,NT)					PREP	480
51.	IF (FLG16.NE.0)	GO TO 50					PREP	490
52.	K = K+1						PREP	500
53.	DO 40	I = 1, NT					PREP	510
54.	40	R(I,K) = A(I)					PREP	520
55.	50	IF (NNU) 90, 90, 60					PREP	530
56.	60	DO 80 J = 1, NNU					PREP	540

57.	READ (4) MS, (A(I), I=1, NT)	PREP 550
58.	IF (MS.EQ.1.OR,MS.EQ.2.OR,MS.EQ.5) GO TO 80	PREP 560
59.	K = K+1	PREP 570
60.	DO 70 I = 1, NT	PREP 580
61.	70 R(I,K) = A(I)	PREP 590
62.	80 CONTINUE	PREP 600
63.	90 IF (FLG14.LE.0) GO TO 170	PREP 610
64.	NR= NMA+1	PREP 620
65.	READ (4) (R(I,I), I=NR,NT)	PREP 630
66.	REWIND 4	PREP 640
67.	DO 100 I = NR, NT	PREP 650
68.	100 R(I,I) = R(I,I)-FF(I)	PREP 660
69.	IF (FLG14.EQ.NB) GO TO 120	PREP 670
70.	DO 110 I = 1, NMA	PREP 680
71.	READ (9) (A(I),J=1,NT)	PREP 690
72.	A(NT+1) = R(I,1)	PREP 700
73.	110 WRITE (3) (A(I),J=1,L)	PREP 710
74.	120 DO 130 I = NR, NT	PREP 720
75.	READ (9) (A(I),J=1,NT), (A(I),J=1,NT)	PREP 730
76.	A(NT+1) = R(I,1)	PREP 740
77.	130 WRITE (3) (A(I),J=1,L)	PREP 750
78.C	PRESCRIBED TANGENTIAL VELOCITY	INPUT TO SOLVIT ON TAPE 3
79.C		OUTPUT FROM SOLVIT ON TAPE 3
80.C	TAPES 1 AND 2 ARE SCRATCH TAPES	PREP 780
81.	CALL SOLVIT(WKAREA,NT,NSIGA,16000,3,14,2,3)	
82.	REWIND 9	PREP 800
83.	GO TO 230	PREP 810
84.C***	***AXISYMMETRIC FLOW + GENERATED (RESEP) BOUNDARY CONDITIONS	PREP 820
85.C***	***NPB1 = THE NUMBER OF ELEMENTS ON BODY 1	PREP 830
86.C***	***NPB2 = THE NUMBER OF ELEMENTS ON BODY 2	PREP 840
87.	140 NPB1 = ND(1) - 1	PREP 850
88.	NPB2 = ND(2) - 1	PREP 860
89.	NSIGA = 3	PREP 870
90.	NSIGC = 1	PREP 880
91.	NSIGEC = 1	PREP 890
92.	L = NT + NSIGA	PREP 900
93.C***	***L IS THE TOTAL WIDTH OF THE MATRIX FOR AXISYMMETRIC FLOW INCL	PREP 910
94.C***	***RIGHT HAND SIDES	PREP 920
95.	READ (4)	PREP 930
96.	READ(4) (COSSQR(I), I = 1, NPB1), (RHS(I), I = 1, NPB1)	PREP 940
97.	REWIND 4	PREP 950
98.	DO 150 I = 1, NPB1	PREP 960
99.	R(I,1) = 0.0	PREP 970
100.	R(I,2) = 1.0	PREP 980
101.	150 R(I,3) = COSSQR(I)	PREP 990
102.	NBEGIN = NPB1 + 1	PREP1000
103.	NEND = NPB1 + NPB2	PREP1010
104.	DO 160 I = NBEGIN, NEND	PREP1020
105.	R(I,1) = 1.0	PREP1030
106.	R(I,2) = 0.0	PREP1040
107.	160 R(I,3) = 0.0	PREP1050
108.	170 REWIND 4	PREP1060
109.	ASSIGN 190 TO M	PREP1070
110.	IF (FLG14.NE.0) ASSIGN 180 TO M	PREP1080
111.	DO 220 I = 1, NT	PREP1090
112.	GO TO M, (180 , 190)	PREP1100
113.	180 READ (9) (A(I),J=1,NT), (A(I),J=1,NT), (A(I),J=1,NT)	PREP1110

114.	GO TO 200.	PREP1120
115.	190 READ (9) (A(J),J=1,NT)	PREP1130
116.	200 DO 210 J = 1, NSIGA	PREP1140
117.	K = NT+J	PREP1150
118.	210 A(K) = R(I,J)	PREP1160
119.	220 WRITE (3) (A(J),J=1,L)	PREP1170
120.C	AXISYMMETRIC FLOW INPUT TO SOLVIT ON TAPE 3	PREP1180
121.C	OUTPUT FROM SOLVIT ON TAPE 3	PREP1190
122.C	TAPES 1 AND 2 ARE SCRATCH TAPES	PREP1200
123.	CALL SOLVIT(WKAREA,NT,NSIGA,16000,3,14,2,3)	
124.	REWIND 9	PREP1220
125.C **	* PREPARE CROSSFLOW MATRIX TAPE (11)	PREP1230
126.C **	* SKIP SINA * READ COSA	PREP1240
127.	230 IF (FLG04.EQ.0) GO TO 400	PREP1250
128.	K = 0	PREP1260
129.	L = NT+NSIGC	PREP1270
130.	IF (FLG22.GT.0) GO TO 300	PREP1280
131.	READ (4) (A(I),I=1,NT), (A(I),I=1,NT)	PREP1290
132.	IF (FLG17.NE.0) GO TO 250	PREP1300
133.	K = K+1	PREP1310
134.	DO 240 I = 1, NT	PREP1320
135.	240 R(I,K) = A(I)	PREP1330
136.	250 IF (NNU) 290, 290, 260	PREP1340
137.	260 DO 280 J = 1, NNU	PREP1350
138.	READ (4) MS, (A(I),I=1,NT)	PREP1360
139.	IF (MS.EQ.0.OR.MS.EQ.2.OR.MS.EQ.4) GO TO 280	PREP1370
140.	K = K+1	PREP1380
141.	DO 270 I = 1, NT	PREP1390
142.	270 R(I,K) = -A(I)	PREP1400
143.	280 CONTINUE	PREP1410
144.	290 REWIND 4	PREP1420
145.	GO TO 330	PREP1430
146.C***	***CROSS FLOW * GENERATED (RESEPI) BOUNDARY CONDITIONS	PREP1440
147.	300 DO 310 I = 1,NPB1	PREP1450
148.	310 R(I,1) = -RHS(I)	PREP1460
149.	DO 320 I = NBEGIN,NEND	PREP1470
150.	320 R(I,1) = 0.0	PREP1480
151.	330 ASSIGN 360 TO M	PREP1490
152.	IF (FLG12.NE.0) ASSIGN 340 TO M	PREP1500
153.	DO 390 I = 1, NT	PREP1510
154.	GO TO M, (340, 360)	PREP1520
155.	340 READ (10) (A(J),J=1,NT), (A(J),J=1,NT), (A(J),J=1,NT)	PREP1530
156.C***	***FORM PHI MATRIX FROM THETA (CROSS FLOW) MATRIX	PREP1540
157.	DO 350 J = 1,NT	PREP1550
158.	350 A(J) = Y2(I) * A(J)	PREP1560
159.	GO TO 370	PREP1570
160.	360 READ (10) (A(J),J=1,NT)	PREP1580
161.	370 DO 380 J = 1, NSIGC	PREP1590
162.	K = NT+J	PREP1600
163.	380 A(K) = -R(I,J)	PREP1610
164.	390 WRITE (11) (A(J),J=1,L)	PREP1620
165.C	CROSS FLOW INPUT TO SOLVIT ON TAPE 11	PREP1630
166.C	OUTPUT FROM SOLVIT ON TAPE 3	PREP1640
167.C	TAPES 1 AND 2 ARE SCRATCH TAPES	PREP1650
168.	CALL SOLVIT(WKAREA,NT,NSIGC,16000,11,14,2,3)	
169.	REWIND 10	PREP1670
170.	400 CONTINUE	PREP1680

171.C***	***EXTRA CROSS FLOW	PREP1690
172.	REWIND 11	PREP1700
173.	IF (FLG21.CQ.O .AND. FLC2.EQ.O) GO TO 790	PREP1710
174.	K = 0	PREP1720
175.	L = NT + NSIGEC	PREP1730
176.	IF (FLG22.GT.C) GO TO 430	PREP1740
177.C***	***EXTRA CROSS FLOW * NON-UNIFORM FLOW ONLY	PREP1750
178.C***	***SKIP RECORD WITH SINES AND COSINES	PREP1760
179.	READ (4)	PREP1770
180.	DO 420 J=1,NNH	PREP1780
181.	READ(4) MS, (A(I),I=1,NT)	PREP1790
182.	IF (MS.LT.2.OR.MS.EQ.3) GO TO 420	PREP1800
183.	K = K + 1	PREP1810
184.	DO 410 I = 1,NT	PREP1820
185. 410	R(I,K) = A(I)	PREP1830
186. 420	CONTINUE	PREP1840
187.	GO TO 460	PREP1850
188.C***	***EXTRA CROSS FLOW * GENERATED (RESEP) BOUNDARY CONDITIONS	PREP1860
189. 430	DO 440 I = 1,NPB1	PREP1870
190. 440	R(I,1) = COSSCR(I)	PREP1880
191.	DO 450 I = NBEGIN,NEND	PREP1890
192. 450	R(I,1) = 0.0	PREP1900
193. 460	REWIND 4	PREP1910
194.C***	***M IS 192R * SOLVE A MATRIX	PREP1920
195.	ASSIGN 470 TO M	PREP1930
196.C***	***M IS 194D * SOLVE POTENTIAL MATRIX	PREP1940
197.	IF (FLG12.NE.C) ASSIGN 480 TO M	PREP1950
198.	DO 520 I = 1,NT	PREP1960
199.	GO TO M, (470 , 480)	PREP1970
200.C***	***SOLVE A MATRIX	PREP1980
201. 470	READ (8) (A(I),J=1,NT)	PREP1990
202.	GO TO 530	PREP2000
203. 480	READ (8) (A(I),J=1,NT), (A(I),J=1,NT), (A(I),J=1,NT)	PREP2010
204.C***	***FORM PHI MATRIX FROM THETA (EXTRA CROSS FLOW) MATRIX	PREP2020
205.	DO 490 J = 1,NT	PREP2030
206. 490	A(I) = Y2(I) * A(I) / 2.C	PREP2040
207. 500	DO 510 J = 1,NSIGEC	PREP2050
208.	K = NT + J	PREP2060
209. 510	A(K) = R(I,J)	PREP2070
210. 520	WRITE (11) (A(I),J=1,L)	PREP2080
211.C***	***EXTRA CROSS FLOW INPUT TO SOLVIT ON TAPE 11	PREP2090
212.C***	***OUTPUT FROM SOLVIT ON TAPE 3	PREP2100
213.C***	***TAPES 1 AND 2 ARE SCRATCH TAPES	PREP2110
214.	CALL SOLVIT (WKAREA,NT,NSIGEC,16GDC,11,14,2,3)	PREP2130
215.	REWIND 8	PREP2140
216.	REWIND 11	PREP2150
217.	GO TO 790	PREP2160
218. 530	IF (FLG23 .GT. 0) GO TO 570	PREP2170
219.	NR = NT - NMA	PREP2180
220.	L = NMA+1	PREP2190
221.	READ (4) (R(I,1),I=1,NMA)	PREP2200
222.	READ (4) (FF(I),I=1,NR)	PREP2210
223.	DO 540 I = 1, NR	PREP2220
224. 540	FF(I) = FF(I)/FOURPI	PREP2230
225.	BACKSPACE 4	PREP2240
226.	WRITE (4) (FF(I),I=1,NR)	PREP2250
227.	REWIND 4	

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228.      DO 560 J = 1, NMA
229.        READ (9) (A(J),J=1,NMA),(T(J),J=1,NP)
230.        DO 550 J = 1, NR
231.          550 R(I,J) = R(I,J) - T(J)*FF(J)
232.          A(L) = R(I,J)
233.        560 WRITE (3) (A(J),J=1,L)
234.C  PRESCRIBED VORTICITY      INPUT FOR SOLVIT ON TAPE 3
235.C                          OUTPUT FROM SOLVIT ON TAPE 3
236.C  TAPES 1 AND 2 ARE SCRATCH TAPES
237.      CALL SOLVIT(WKAREA,NMA,L - NMA,16000,3,14,2,3)
238.      REWIND 9
239.      GO TO 230
240.    570 NR = NT - NMA
241.      NMAP1 = NMA + 1
242.C*** * CALCULATE THE NUMBER OF RHS
243.C
244.      LL = 0
245.      DO 580 I=1,NR
246.        IF( NLF(I) .GT. 0 )GO TO 580
247.        LL = LL + 2
248.    580 CONTINUE
249.      L = NMAP1 + LL
250.C
251.C*** * READ SINS FOR STREAMFLOW RHS
252.C
253.      READ(4) ( R(I,1),I=1,NMA )
254.C
255.C*** * READ INPUT PRESCRIBED VORTICITIES
256.C
257.      READ(4) ( FF(I),I=NMAP1,NT )
258.      WRITE(6, 590 ) (FF(I),I=NMAP1,NT)
259.    590 FORMAT(1H1, ' THE INPUT PV ARE ',(16E20.7))
260.      DO 600 I = NMAP1,NT
261.        600 FF(I) = FF(I) / (1-FOURPI)
262.C
263.C*** * READ STRIP VORTEX RHS
264.C
265.      LLD2P1 = LL/2 + 1
266.      DO 610 J=2,LLD2P1
267.        610 READ(4)MS,( R(I,J),I=1,NMA )
268.C
269.C*** * IPV IS BODY NUMBER OF 1ST PRESCRIBED VORTICITY BODY
270.C
271.      IPV = NB - FLG14 + 1
272.      JBOD = LLD2P1
273.      NN = NMA
274.C
275.      DO 620 KCNT = IPV,NB
276.        JBOD = JBOD + 1
277.        NN = NN + ND(KCNT) - 1
278.C
279.C*** * READ COLUMN OF RHS CALCULATED BY NOTS FORMULA
280.C
281.      READ(4) (R(ICNT,JBOD),ICNT = 1,NMA)
282.C
283.C*** * MULTIPLY NOTS COLUMN BY LAST PRESCRIBED VORTICITY ON THAT BODY
284.C

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PREP2260
 PREP2270
 PREP2280
 PREP2290
 PREP2300
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 PREP2780
 PREP2790
 PREP2800
 PREP2810
 PREP2820

285.	DO 620 ICNT=1,NMA	PREP2830
286.	620 R(ICNT,JBOD) = R(ICNT,JBOD) * FF(NN) * (-FOURPI)	PREP2840
287.C		PREP2850
288.	REWIND 4	PREP2860
289.	DO 650 I=1,NMA	PREP2870
290.	NEND = NMA	PREP2880
291.	JBOD = LLO2P1	PREP2890
292.	READ(9) (A(I),J=1,NMA), (T(I),J=NMA+1,NT)	PREP2900
293.C		PREP2910
294.	DO 630 NCNT=IPV,NB	PREP2920
295.	JBOD = JBOD + 1	PREP2930
296.	NBEG = NEND + 1	PREP2940
297.	NEND = NEND + ND(ICNT) - 1	PREP2950
298.C		PREP2960
299.C***	* SUM PV VORTEX ELEMENTS * INPUT PV AND ADD TO NOTS RHS	PREP2970
300.C		PREP2980
301.	DO 630 NCNT=NBEG,NEND	PREP2990
302.C		PREP3000
303.C	*** WHEN COMING OFF UNIT 9, THE VORTEX ELEMENTS(T(I)) ARE STILL	PREP3010
304.C	*** WHILE NOTS COLUMNS COMING OFF UNIT 4 ARE RHS. THE TWO SHOULD	PREP3020
305.C	*** ADDED TO FORM A COMPLETE RHS, BUT THEY ARE SUBTRACTED SINCE THE	PREP3030
306.C	*** OF T(I) MUST BE CHANGED	PREP3040
307.C		PREP3050
308.	630 R(I,JBOD) = R(I,JBOD) - T(ICNT) * IF(ICNT)	PREP3060
309.C		PREP3070
310.C***	* ATTACH ALL RHS FOR ROW NUMBER I	PREP3080
311.C		PREP3090
312.	LRHS = 0	PREP3100
313.	DO 640 ICNT=NMA+1,L	PREP3110
314.	LRHS = LRHS + 1	PREP3120
315.	640 A(ICNT) = R(I,LRHS)	PREP3130
316.C		PREP3140
317.	650 WRITE(31(A(I),J=1,I)	PREP3150
318.C***	* RING WING OPTION INPUT FOR SOLVIT ON TAPE 3	PREP3160
319.C***	* OUTPUT FOR SOLVIT ON TAPE 3	PREP3170
320.C		PREP3180
321.	CALL SOLVIT(WKAREA,NMA,L-NMA,16000,3,1,2,3)	PREP3190
322.	REWIND 9	PREP3200
323.	GO TO 230	PREP3210
324.	660 WRITE(6, 670)	PREP3220
325.	670 FORMAT(61H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR PRESCRIBED VORT	PREP3230
326.	1ICITY)	PREP3240
327.	GO TO 780	PREP3250
328.	680 WRITE(6, 690)	PREP3260
329.	690 FORMAT(71H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR PRESCRIBED TANG	PREP3270
330.	1ENTIAL VELOCITY)	PREP3280
331.	GO TO 780	PREP3290
332.	700 WRITE (6, 710)	PREP3300
333.	710 FORMAT(58H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR AXISYMMETRIC FL	PREP3310
334.	1OW)	PREP3320
335.	GO TO 780	PREP3330
336.	720 WRITE(6, 730)	PREP3340
337.	730 FORMAT(51H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR CROSS FLOW)	PREP3350
338.	GO TO 780	PREP3360
339.	740 WRITE (6, 750)	PREP3370
340.	750 FORMAT(57H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR EXTRA CROSS FL	PREP3380
341.	1OW)	PREP3390

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342.	GO TO 780	PREP3400
343.	760 WRITE(6, 770)	PREP3410
344.	770 FORMAT(51H NOT ENOUGH SPACE RESERVED IN SOLVIT FOR RING WING)	PREP3420
345.	780 STOP	PREP3430
346.	790 RETURN	I
347.C	790 CONTINUE	C
348.	END	PREP3440

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50.PCHC

25 AUG 75 18

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1. SUBROUTINE PUNCHC(R,J,LOC,CASE)
2. DIMENSION R(400)
3. CALL PUNCH 3 ( R, J, LOC, NSEQ, D, CASE, PROG)
4. NSEQ = NSEQ + 1
5. RETURN
6. END
```

PNCH 110
PNCH 120

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50.PCHV		25 AUG 75 18
1.	SUBROUTINE PUNCHV (AP, J, L, LOC, CASE)	PNCH 20
2.C		PNCH 10
3.	DIMENSION AP(500,5),T(500)	PNCH 40
4.	DATA PROG / 40E00A /, NSEQ / 1 /	PNCH 30
5.	DO 20 I = 1, L	PNCH 50
6.	DO 10 K = 1, J	PNCH 60
7.	10 T(K) = AP(K, I)	PNCH 70
8.	20 CALL PUNCH 3 (I, J, LOC, NSEQ, D, CASE, PROG)	PNCH 80
9.	30 NSEQ = NSEQ + 1	PNCH 130
10.	RETURN	PNCH 140
11.	END	PNCH 150

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50.PCH3		25 AUG 75	18
1.	SUBROUTINE PUNCH 3 (VALUE, N, LOC, NSEQ, K1264, KASE, PROG)	PNH3	20
2.C		PNH3	10
3.	DOUBLE PRECISION A, B, C, D, FMT	PNH3	30
4.	DOUBLE PRECISION CMT	PNH3	40
5.	DIMENSION VALUE(1), A(11), B(4), FMT(15), V(4), C(7)	PNH3	50
6.	DIMENSION CMT(16)	PNH3	60
7.	DATA CMT(1)/5H1H , /,A(1)/6HF12.9,/,A(2)/6HF12.8,/,A(3)/6HF12.7,/,		
8.	1 A(4)/6HF12.6,/,A(5)/6HF12.5,/,A(6)/6HF12.4,/,A(7)/6HF12.3,/,		
9.	2 A(8)/6HF12.2,/,A(9)/6HF12.1,/,A(10)/6HF12.0,/,A(11)/6HX.A6,/,		
10.	3 B(1)/3H11,/,B(2)/3H12,/,B(3)/3H13,/,B(4)/3H14,/,C(1)/6H3H000,/,		
11.	5 C(2)/5H2H00,/,C(3)/4H1H0,/,C(4)/3H,/,C(5)/3H1X,/,C(6)/4H1H,/,		
12.	6 C(7)/4H12X,/,D/5HERROR/,FMT(1)/1H(,FMT(8)/4H11X,/,FMT(10)/3H1X,/,		
13.	7 FMT(11)/6HA6,1X,/,FMT(12)/3HA4,/,FMT(15)/1H/		
14.C	FUNCTION STATEMENT TO SIZE 'LOC' AND 'NSEQ'	PNH3	170
15.	ISIZE(IK) = MOD(ABS(IK), 10000)	PNH3	180
16.	NSEQ = ISIZE(NSEQ)	PNH3	190
17.	LOC = ISIZE(LOC)	PNH3	200
18.C	START FORMING THE FORMAT.	PNH3	210
19.	FMT(9) = C(5)	PNH3	220
20.	K = 1	PNH3	230
21.	M = N	PNH3	240
22.	NF = 4	PNH3	250
23.C	START OF LOOP	PNH3	260
24.	10 IF (M - 4) 20 , 40 , 40	PNH3	270
25.	20 IF (M .LE. 0) RETURN	PNH3	280
26.	FMT(9) = C(K1264+5)	PNH3	290
27.	NT = M + 1	PNH3	300
28.C	IF THE ENTIRE CARD IS NOT USED, THIS WILL SET UP THE BLANK FIELDS.	PNH3	310
29.	DO 30 I = NT, 4	PNH3	320
30.	30 FMT(I+1) = C(7)	PNH3	330
31.	NF = M	PNH3	340
32.C	DETERMINE THE SIZE OF THE NUMBERS.	PNH3	350
33.	40 DO 80 NT = 1, NF	PNH3	360
34.	V(NT) = ABS(VALUE(K)) + 5.0E-10	PNH3	370
35.	DO 50 I = 1, 10	PNH3	380
36.	V(NT) = V(NT) / 10.0	PNH3	390
37.	IF (V(NT) .LT. 1.0) GO TO 60	PNH3	400
38.	50 CONTINUE		
39.C	IF CONTROL REACHES THIS POINT, THE NUMBER EXCEEDED 1CF10.	PNH3	410
40.	V(NT) = 0	PNH3	420
41.	I = 11	PNH3	430
42.	GO TO 70	PNH3	440
43.	60 V(NT) = VALUE(K)	PNH3	450
44.	70 K = K + 1	PNH3	460
45.	80 FMT(NT+1) = A(I)	PNH3	470
46.C	DETERMINE THE SIZE OF 'LOC'.	PNH3	480
47.	90 L = LOC	PNH3	490
48.	DO 100 I = 1, 4	PNH3	500
49.	L = L / 10	PNH3	510
50.	IF (L .EQ. 0) GO TO 110	PNH3	520
51.	100 CONTINUE		
52.C	IF CONTROL REACHES THIS POINT, 'LOC' EXCEEDED 10000.	PNH3	530
53.	LOC = ISIZE(LOC)	PNH3	540
54.	GO TO 90	PNH3	550
55.C	SET UP THE LOCATION FIELD.	PNH3	560
56.	110 FMT(6) = C(1)	PNH3	570

57.	FMT(7) = B(1)	PNH3 580
58.C	DETERMINE THE SIZE OF 'NSEQ'.	PNH3 590
59. 120	L = NSEQ	PNH3 600
60.	DO 130 I = 1, 4	PNH3 610
61.	L = L / 10	PNH3 620
62.	IF (L.EQ. 0) GO TO 140	PNH3 630
63. 130	CONTINUE	
64.C	IF CONTROL REACHES THIS POINT, 'NSEQ' EXCEEDED 10000.	PNH3 640
65.	NSEQ = ISIZE(NSEQ)	PNH3 650
66.	GO TO 120	PNH3 660
67.C	SET UP THE SEQUENCE FIELD.	PNH3 670
68. 140	FMT(13) = C(1)	PNH3 680
69.	FMT(14) = B(1)	PNH3 690
70.C	WRITE THE CARD IMAGE.	PNH3 700
71.200	FORMAT(4E13.8)	
72.	WRITE (7,200) (V(I), I=1,NF)	PNH3 710
73.C**	***CHANGE VARIABLE FORMAT FOR PRINTER SO THAT THE CARRIAGE CONTRO	PNH3 720
74.C***	***CHARACTER IS A BLANK	PNH3 730
75.	DO 150 ICMT = 2,16	PNH3 740
76. 150	CMT(ICMT) = FMT(ICMT - 1)	PNH3 750
77.	WRITE(6,300) (V(I), I=1,NF)	
78. 300	FORMAT(1H,4E13.8)	
79.	NSEQ = NSEQ + 1	PNH3 780
80.	LOC = LOC + 4	PNH3 790
81.	M = M - 4	PNH3 800
82.	GO TO 10	PNH3 810
83.	END	PNH3 820

50.000		25 AUG 75	18
1.	SUBROUTINE QC(OMEG,OM,Q)	QC	20
2.C		QC	10
3.C	THIS SUBROUTINE CALCULATES THE LEGENDRE FUNCTIONS OF THE SECOND KIND	QC	30
4.C	AND HALF ORDER. THE ARGUMENTS ARE:	QC	40
5.C	OMEG ARGUMENT FOR WHICH LEGENDRE FUNCTIONS WILL BE FOUND	QC	50
6.C	QM VALUE OF LEGENDRE FUNCTION OF MINUS ONE HALF ORDER	QC	60
7.C	Q VALUE OF LEGENDRE FUNCTION OF PLUS ONE HALF ORDER	QC	70
8.	DOUBLE PRECISION OMEGD,ARG,A,F,E,QMD,QD	QC	80
9.	OMEGD=OMEG	QC	90
10.	ARG=2.0/(OMEGD+1.0)	QC	100
11.	A=1.0-ARG	QC	110
12.	CALL ELLC (A,F,E,1)	QC	120
13.	CALL ELLC (A,F,E,2)	QC	130
14.	QMD=F*ARG**0.5	QC	140
15.	QD=-E*12.0*(OMEGD+1.0)**0.5*OMEGD*QMD	QC	150
16.	QM=QMD	QC	160
17.	Q=QD	QC	170
18.	RETURN	QC	180
19.	END	QC	190

50.	RAKFL		25 AUG 75	18
1.		SUBROUTINE RAKFLO(VX,VY,NSIG)		RKFL 20
2.C				RKFL 10
3.C		THIS ROUTINE INTEGRATES THE MASS FLOW THROUGH EACH OF THE 'AUTOMATIC'		RKFL 30
4.C		RAKES.		RKFL 40
5.C				RKFL 50
6.		COMMON /BLOCKR/ NRAKES,IRAKE(20,9),RAKEA(20),RUNITX(20),		RKFL 60
7.		1 RUNITV(20),RDS(20),NRPTS(20),COSTH(20),IRAKF,NOFF,X1R(20),		RKFL 70
8.		2 Y1R(20),X2R(20),Y2R(20)		RKFL 80
9.		DIMENSION VX(500,5),VY(500,5),F(20),UX(20),UY(20)		RKFL 90
10.		REAL NX,NY,MDO		RKFL 100
11.		DATA TWOPI/6.2831854/		RKFL 110
12.		WRITE (6, 50)		RKFL 120
13.		DO 40 ISIG=1,NSTG		RKFL 130
14.		J = NOFF		RKFL 140
15.C		LOOP FOR EACH RAKE ...		RKFL 150
16.		DO 30 IRAKE=1,NRAKES		RKFL 160
17.C		SETUP THE VELOCITY VECTORS FOR THIS RAKE ...		RKFL 170
18.		HP1 = NRPTS(IRAKE) + 1		RKFL 180
19.		DO 10 I=2,HP1		RKFL 190
20.		J = J + 1		RKFL 200
21.		UX(I) = VX(J,ISIG)		RKFL 210
22.		UY(I) = VY(J,ISIG)		RKFL 220
23.C				RKFL 230
24.C		USE LINEAR EXTRAPOLATION TO CALCULATE THE VELOCITY AT BOTH ENDS OF THE		RKFL 240
25.C		RAKE (I.E. AT THE BEGINNING OF THE FIRST INTERVAL AND AT THE END OF		RKFL 250
26.C		THE LAST INTERVAL) ...		RKFL 260
27.		UX(1) = UX(2) + (UX(2) - UX(3))		RKFL 270
28.		UY(1) = UY(2) + (UY(2) - UY(3))		RKFL 280
29.		NPTS = NRPTS(IRAKE) + 2		RKFL 290
30.		UX(NPTS) = UX(NPTS-1) + (UX(NPTS-1) - UX(NPTS-2))		RKFL 300
31.		UY(NPTS) = UY(NPTS-1) + (UY(NPTS-1) - UY(NPTS-2))		RKFL 310
32.C				RKFL 320
33.C		NOW SETUP THE FUNCTION (V DOT N)*(DA) ...		RKFL 330
34.		NX = RUNITX(IRAKE)		RKFL 340
35.		NY = RUNITV(IRAKE)		RKFL 350
36.		DS = RDS(IRAKE)		RKFL 360
37.		Y1 = Y1R(IRAKE)		RKFL 370
38.		COS = COSTH(IRAKE)		RKFL 380
39.		S = 0.0		RKFL 390
40.		DO 20 I=1,NPTS		RKFL 400
41.		F(I) = TWOPI*((UX(I)*NX + UY(I)*NY)*(Y1 + S*COS))		RKFL 410
42.		20 S = S + DS		RKFL 420
43.C				RKFL 430
44.C		PERFORM SIMPSON RULE INTEGRATION ...		RKFL 440
45.		CALL SIMSON(F,NPTS,DS,MDO)		RKFL 450
46.C				RKFL 460
47.		VAVG = MDO / RAKEA(IRAKE)		RKFL 470
48.		WRITE (6, 60) ISIG,IRAKE,X1R(IRAKE),Y1R(IRAKE),X2R(IRAKE),Y2R(IRAKE)		RKFL 480
49.		1KE),IRNAME(IRAKE,I),I=1,9,RAKEA(IRAKE),VAVG,MDO		RKFL 490
50.		30 CONTINUE		RKFL 500
51.C				RKFL 510
52.		40 WRITE (6, 70)		RKFL 520
53.C				RKFL 530
54.		RETURN		RKFL 540
55.C				RKFL 550
56.C				RKFL 560

57.	50	FORMAT(1H1,38X,'A U T O M A T I C R A K E C A L C U L A T I O	RKFL 570
58.		IN S',//1H0,101X,'TOTAL',4X,'AVERAGE',6X,'TOTAL',/' AXI.FLOW RAKE	RKFL 580
59.	2,88X,'FLUX',6X,'FLUX',6X,'VOLUME',/'	NUMBER NO.',6X,'X1',9X,	RKFL 590
60.	3'Y1',9X,'X2',9X,'Y2',6X,'***** INPUT IDENTIFICATION *****',6X,		RKFL 600
61.	4'AREA VELOCITY FLUX RATE',/1H)		RKFL 610
62.	60	FORMAT(13X,13,18,2X,4F11.5,2X,8A4,A3,F12.4,F11.6,F11.5)	RKFL 620
63.	70	FORMAT(1H0)	RKFL 630
64.		END	RKFL 640

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50.SIMS0		25 AUG 75 18
1.	SUBROUTINE SIMSON(Y,N,DX,AREA)	SIMS 20
2.C		SIMS 10
3.C		SIMS 30
4.C	THIS ROUTINE INTEGRATES Y OVER (N-1) INTERVALS OF EQUAL LENGTH, DX,	SIMS 40
5.C	YIELDING THE ENCLOSED AREA. (N MUST BE AN ODD INTEGER.)	SIMS 50
6.C		SIMS 60
7.	DIMENSION Y(1)	SIMS 70
8.C		SIMS 80
9.	SUM = Y(1) + 4.0*Y(N-1) + Y(N)	SIMS 90
10.	IF (N .EQ. 3) GO TO 20	SIMS 100
11.	NM2 = N - 2	SIMS 110
12.	DO 10 I=2,NM2,2	SIMS 120
13.	10 SUM = SUM + 4.0*Y(I) + 2.0*Y(I+1)	SIMS 130
14.C		SIMS 140
15.	20 AREA = (ABS(DX)/3.0) * SUM	SIMS 150
16.	RETURN	SIMS 160
17.	END	SIMS 170

50.SOLCH		25 AUG 75 18 -
1.	SUBROUTINE SOLCOMF DV, A, ICNTI	SLCM 20
2.C		SLCM 30
3.C		SLCM 40
4.C **	NOTE THAT THIS SUBROUTINE SOLVES ONLY A 1X1 OR 2X2 MATRIX	SLCM 50
5.C **	IT IS SEPARATED SO THAT IF PROGRAM IS EVER ENLARGED, THIS	SLCM 60
6.C **	IS WHERE THE MATRIX SOLUTION FOR THE COMBINATION PART OF	SLCM 70
7.C **	THE PROGRAM WILL GO. THE MATRICES HAVE BEEN FORMED GENERALLY	SLCM 80
8.C **	IN SUBROUTINE COMBO.	SLCM 90
9.C		SLCM 100
10.	DIMENSION DV(2), A(2,2)	SLCM 110
11.	IF (ICNT .EQ. 2) GO TO 10	SLCM 120
12.	DV(1) = DV(1) / A(1,1)	SLCM 130
13.	RETURN	SLCM 140
14.	10 DV(1) = (DV(1) - (A(1,2)/A(2,2)) * DV(2)) /	SLCM 150
15.	1 (A(1,1) - A(1,2)*A(2,1) / A(2,2))	SLCM 160
16.	DV(2) = (DV(2) - A(2,1)*DV(1)) / A(2,2)	SLCM 170
17.	RETURN	SLCM 180
18.	END	

50.SOLV		25 AUG 75 18
1.	SUBROUTINE SOLVIT (A, MD, MD, MD, NI, MM, NO, NW)	SLVT 20
2.C		SLVT 10
3.C		SLVT 30
4.C		SLVT 40
5.C	**** ***/ ***** ***** *	SLVT 50
6.C	* * * /* * * * * /* *****	SLVT 60
7.C	**** **** * / * * * * * / * **** * *	SLVT 70
8.C	* * * / * * * * * / * * *	SLVT 80
9.C	* /*** * * ***** /*** * *	SLVT 90
10.C		SLVT 100
11.C	DIRECT MATRIX SOLUTION	SLVT 110
12.C		SLVT 120
13.C	WRITTEN BY J. L. HESS * PROGRAMMED BY T. K. RIDDELL	SLVT 130
14.C		SLVT 140
15.	DIMENSION A (MD)	SLVT 150
16.C		SLVT 160
17.	LOGICAL LAST	SLVT 170
18.C		SLVT 180
19.	CALL TIMEV(AA1)	SLVT 190
20.	N = NO	SLVT 200
21.	M = MD	SLVT 210
22.	KORE = MD	SLVT 220
23.	NPM = N + M	SLVT 230
24.	IF (MAXD(3 + NPM, M + NI) .GT. KORE) GO TO 300	SLVT 240
25.	MT = MM	SLVT 250
26.	REWIND MT	SLVT 260
27.	NIN = NI	SLVT 270
28.	REWIND NIN	SLVT 280
29.	NOUT = NO	SLVT 290
30.	REWIND NOUT	SLVT 300
31.	MP1 = M + 1	SLVT 310
32.	NN = N	SLVT 320
33.	NEL = NPM	SLVT 330
34.C		SLVT 340
35.C	-- CALCULATE THE MAXIMUM NO. OF ROWS, *K*	SLVT 350
36.C		SLVT 360
37.	10 K = (KORE - NEL) / NEL	SLVT 370
38.C		SLVT 380
39.C	-- TEST TO SEE IF THE REST OF THE MATRIX WILL FIT IN CORE	SLVT 390
40.C		SLVT 400
41.	LAST = K .GE. NN	SLVT 410
42.	IF (.LAST) K = NN	SLVT 420
43.C		SLVT 430
44.C	-- READ *K* ROWS OF THE AUGMENTED *A* MATRIX	SLVT 440
45.C		SLVT 450
46.	NT = 0	SLVT 460
47.	DO 20 IB = 1, K	SLVT 470
48.	NS = NT + 1	SLVT 480
49.	NT = NT + NEL	SLVT 490
50.	20 READ (NIN) (A(10), IO = NS, NT)	SLVT 500
51.C		SLVT 510
52.C	-- CHECK TO SEE IF WE WERE UNLUCKY ENOUGH TO END UP WITH ONLY ONE ROW	SLVT 520
53.C		SLVT 530
54.	IF (K .EQ. 1) GO TO 80	SLVT 540
55.C		SLVT 550
56.C	-- *K* IS GREATER THAN *1* SO WE CAN START THE TRIANGULARIZATION	SLVT 560

57.C		SLVT 570
58.	NELP1 = NEL + 1	SLVT 580
59.	NS = - NEL	SLVT 590
60.	NELP2 = NELP1 + 1	SLVT 600
61.C		SLVT 610
62.C	-- FORM THE 'TRAPEZOIDAL' ARRAY (8)	SLVT 620
63.C		SLVT 630
64.	DO 30 IB = 2, K	SLVT 640
65.	NP = NELP2 - IB	SLVT 650
66.	NS = NS + NELP1	SLVT 660
67.	NT = NS	SLVT 670
68.	DO 30 IO = IB, K	SLVT 680
69.	NT = NT + NEL	SLVT 690
70.	MN = NT	SLVT 700
71.	NB = NS	SLVT 710
72.	A(NT) = (-A(NT)) / A(NS)	SLVT 720
73.	DO 30 NP = 2, NP	SLVT 730
74.	MN = MN + 1	SLVT 740
75.	NB = NB + 1	SLVT 750
76.	30 A(MN) = A(MN) + A(NT) * A(NB)	SLVT 760
77.	IF (LAST) GO TO 80	SLVT 770
78.C		SLVT 780
79.C	-- WRITE THE 'TRAPEZOIDAL' MATRIX ON TAPE	SLVT 790
80.C		SLVT 800
81.	NT = 0	SLVT 810
82.	NP = NEL	SLVT 820
83.	NS = - NEL	SLVT 830
84.	DO 40 IO = 1, K	SLVT 840
85.	NS = NS + NELP1	SLVT 850
86.	NT = NT + NEL	SLVT 860
87.	WRITE (INT) NP, (ATIB), IB = NS, NT	SLVT 870
88.	40 NP = NP - 1	SLVT 880
89.	NP = NP - N	SLVT 890
90.	NS = KORE - NEL + 1	SLVT 900
91.C		SLVT 910
92.C	-- READ ANOTHER ROW	SLVT 920
93.C		SLVT 930
94.	DO 70 IO = 1, NP	SLVT 940
95.	READ (NIN) (ATIB), IB = NS, KORE	SLVT 950
96.C		SLVT 960
97.C	-- MODIFY THIS ROW BY THE 'TRAPEZOIDAL' ARRAY	SLVT 970
98.C		SLVT 980
99.	NT = 1	SLVT 990
100.	MN = NS	SLVT 1000
101.	DO 60 IB = 1, K	SLVT 1010
102.	NB = NT	SLVT 1020
103.	NF = MN + 1	SLVT 1030
104.	A(MN) = (-A(MN)) / A(NT)	SLVT 1040
105.	DO 50 NN = NF, KORE	SLVT 1050
106.	NB = NB + 1	SLVT 1060
107.	50 A(NN) = A(NN) + A(MN) * A(NB)	SLVT 1070
108.	MN = NF	SLVT 1080
109.	60 NT = NT + NELP1	SLVT 1090
110.C		SLVT 1100
111.C	-- WRITE THE MODIFIED ROW ON TAPE	SLVT 1110
112.C		SLVT 1120
113.	70 WRITE (NOUT) (A(NT), NT = MN, KORE)	SLVT 1130

114.	REWIND NOUT	SLVT1140
115.	REWIND NIN	SLVT1150
116.C		SLVT1160
117.C	- - SWITCH THE TAPES	SLVT1170
118.C		SLVT1180
119.	NT = NIN	SLVT1190
120.	NIN = NOUT	SLVT1200
121.	NOUT = NT	SLVT1210
122.C		SLVT1220
123.C	- - RE-CALCULATE ROW LENGTH AND LOOP BACK	SLVT1230
124.C		SLVT1240
125.	NEL = NEL - K	SLVT1250
126.	NN = NEL - M	SLVT1260
127.	GO TO 10	SLVT1270
128.C		SLVT1280
129.C	- - REWIND ALL TAPES	SLVT1290
130.C		SLVT1300
131.	80 REWIND M1	SLVT1310
132.	REWIND NIN	SLVT1320
133.	REWIND NOUT	SLVT1330
134.C		SLVT1340
135.C	- - CONDENSE THE MATRIX	SLVT1350
136.C		SLVT1360
137.	NN = NEL	SLVT1370
138.	NL = NEL + 1	SLVT1380
139.	IF (K .EQ. 1) GO TO 100	SLVT1390
140.	NS = 1	SLVT1400
141.	NT = NEL	SLVT1410
142.	DO 90 JB = 2, K	SLVT1420
143.	NS = NS + NELP1	SLVT1430
144.	NT = NT + NEL	SLVT1440
145.	DO 90 IO = NS, NT	SLVT1450
146.	A(NL) = A(IO)	SLVT1460
147.	90 NL = NL + 1	SLVT1470
148.	100 N1 = KORE - K * M + 1	SLVT1480
149.C		SLVT1490
150.C	- - THERE, NOW WE CAN START THE BACK-SOLUTION	SLVT1500
151.C	* * NOTE..THE FIRST AVAILABLE LOCATION FOR THE SOLUTIONS IS A(N1)	SLVT1510
152.C		SLVT1520
153.	NREM = N	SLVT1530
154.	NEL = NPM	SLVT1540
155.	LAST = K .EQ. N	SLVT1550
156.	NPASS = 0	SLVT1560
157.C		SLVT1570
158.C	- - SOLVE FOR THE ANSWERS CORRESPONDING TO *K* ROWS	SLVT1580
159.C		SLVT1590
160.	110 KM1 = K - 1	SLVT1600
161.	KP1 = K + 1	SLVT1610
162.	NS = NL - MP1	SLVT1620
163.	NPASS = NPASS + 1	SLVT1630
164.	DO 140 MN = 1, M	SLVT1640
165.	NF = NS + MN	SLVT1650
166.	A(NF) = A(NF) / A(NS)	SLVT1660
167.	NT = NS	SLVT1670
168.	IF (KM1 .EQ. 0) GO TO 140	SLVT1680
169.	DO 130 JB = 1, KM1	SLVT1690
170.	NF = NF - JB - M	SLVT1700

171.	NT = NT - MP1 - IB	SLVT1710
172.	SUM = 0.0	SLVT1720
173.	NP = NF	SLVT1730
174.	N2 = MP1 + IB	SLVT1740
175.	DO 120 IO = 1, IB	SLVT1750
176.	NN = NT + IO	SLVT1760
177.	NP = NP + N2 - IO	SLVT1770
178.	120 SUM = SUM + A(NN) * A(NP)	SLVT1780
179.	130 A(NF) = (A(NF) - SUM) / A(NT)	SLVT1790
180.	140 CONTINUE	SLVT1800
181.C		SLVT1810
182.C	-- MOVE THE SOLUTIONS TO CONTIGUOUS LOCATIONS STARTING AT A(N1)	SLVT1820
183.C		SLVT1830
184.	N1 = MORE + 1	SLVT1840
185.	DO 160 NN = 1, K	SLVT1850
186.	DO 150 MN = 1, M	SLVT1860
187.	NL = NL - 1	SLVT1870
188.	N1 = N1 - 1	SLVT1880
189.	150 A(N1) = A(NL)	SLVT1890
190.	160 NL = NL - NN	SLVT1900
191.C		SLVT1910
192.C	-- WRITE THE SOLUTIONS ON TAPE	SLVT1920
193.C		SLVT1930
194.	WRITE (NIN) K	SLVT1940
195.	NS = N1 - 1	SLVT1950
196.	DO 170 MN = 1, M	SLVT1960
197.	N1 = NS + MN	SLVT1970
198.	170 WRITE (NIN) (A(IO), IO = N1, MORE, M)	SLVT1980
199.C		SLVT1990
200.C	-- TEST IF THIS IS THE LAST PASS	SLVT2000
201.C		SLVT2010
202.	IF (LAST) GO TO 250	SLVT2020
203.C		SLVT2030
204.C	-- WE MUST NOW MODIFY THE TRIANGULAR MATRIX TO REFLECT THE EFFECT OF	SLVT2040
205.C	THE SOLUTIONS OBTAINED SO FAR (EO 21)	SLVT2050
206.C	* * NOTE..LOCATIONS A(1) TO A(N1-1) ARE NOW FREE TO USE	SLVT2060
207.C		SLVT2070
208.C	-- CALCULATE THE NEXT VALUES OF 'NEL' AND 'NREM'	SLVT2080
209.C		SLVT2090
210.	NELOLD = NEL	SLVT2100
211.	KOLD = K	SLVT2110
212.	NEL = NEL - K	SLVT2120
213.	NREM = NREM - K	SLVT2130
214.C		SLVT2140
215.C	-- NOW APPLY THE INCREDIBLE FORMULA FOR THE NEW 'K'	SLVT2150
216.C		SLVT2160
217.	$K = (-4 * M - 1) / 2 + \text{IFXISORT}(0.25 + \text{FLRAT}(14 * M + 2) * M +$	SLVT2170
218.	$1/2 * (MORE - NELOLD)))$	SLVT2180
219.	NROW = NREM - K + 1	SLVT2190
220.	IF (K .LT. NREM) GO TO 180	SLVT2200
221.	LAST = .TRUE.	SLVT2210
222.	NROW = 1	SLVT2220
223.	K = NREM	SLVT2230
224.	180 NS = 1	SLVT2240
225.	NT = NELOLD + 1	SLVT2250
226.C		SLVT2260
227.C	-- READ IN THE ROWS TO BE MODIFIED	SLVT2270

228.C			SLVT2280
229.	DO 240 IB = 1, NREF		SLVT2290
230.	NT = NT - 1		SLVT2300
231.	IF (IB .LE. NROW) GO TO 190		SLVT2310
232.	NS = NS + NN		SLVT2320
233.	NT = NT + NN		SLVT2330
234.	190 READ (MT) NN, (A(I0), IO = NS, NT)		SLVT2340
235.	NP = N1 - 1		SLVT2350
236.	NF = NT - M - KM1		SLVT2360
237.	KN = NN - KOLD		SLVT2370
238.	DO 210 MN = 1, M		SLVT2380
239.	N2 = NF		SLVT2390
240.	NA = NP + MN		SLVT2400
241.	NB = NA		SLVT2410
242.	SUM = 0.0		SLVT2420
243.	DO 200 IO = 1, KOLD		SLVT2430
244.	SUM = SUM + A(N2) * A(NA)		SLVT2440
245.	N2 = N2 + 1		SLVT2450
246.	200 NA = NA + M		SLVT2460
247.	N2 = N2 + MN - 1		SLVT2470
248.	210 A(N2) = A(N2) - SUM		SLVT2480
249.C			SLVT2490
250.C	- - WRITE THE MODIFIED ROW ON TAPE OR CONDENSE THE ROW		SLVT2500
251.C			SLVT2510
252.	NL = NT - M + 1		SLVT2520
253.	IF (IB .GE. NROW) GO TO 220		SLVT2530
254.	NF = NL - KP1		SLVT2540
255.	WRITE (NOUT) NN, (A(I0), IO = NS, NF), (A(I0), IO = NL, NT)		SLVT2550
256.	GO TO 240		SLVT2560
257.	220 NF = NL - KOLD		SLVT2570
258.	DO 230 MN = NL, NT		SLVT2580
259.	A(NF) = A(MN)		SLVT2590
260.	230 NF = NF + 1		SLVT2600
261.	240 CONTINUE		SLVT2610
262.	REWIND MT		SLVT2620
263.	REWIND NOUT		SLVT2630
264.C			SLVT2640
265.C	- - SWITCH THE TAPES		SLVT2650
266.C			SLVT2660
267.	NT = MT		SLVT2670
268.	MT = NOUT		SLVT2680
269.	NOUT = NT		SLVT2690
270.C			SLVT2700
271.C	- - LOOP BACK THRU THE SOLUTION		SLVT2710
272.C			SLVT2720
273.	NL = NF		SLVT2730
274.	GO TO 110		SLVT2740
275.C			SLVT2750
276.C	- - START TO WRAP IT UP		SLVT2760
277.C			SLVT2770
278.	250 REWIND NTIN		SLVT2780
279.	N2 = N		SLVT2790
280.C			SLVT2800
281.C	* * NOTE.. AT THIS POINT ALL LOCATIONS A(1) THRU A(KORE) ARE FREE		SLVT2810
282.C			SLVT2820
283.	DO 270 IB = 1, NPASS		SLVT2830
284.	READ (NTIN) K		SLVT2840

285.	$N1 = N2 - K + 1$	SLVT2850
286.	$NS = N1$	SLVT2860
287.	$NT = N2$	SLVT2870
288.C		SLVT2880
289.C	-- READ IN THE SOLUTIONS	SLVT2890
290.C		SLVT2900
291.	DO 260 I0 = 1, M	SLVT2910
292.	READ (NIN) (A1NN), NN = NS, NT)	SLVT2920
293.	$NT = NT + N$	SLVT2930
294.	260 $NS = NS + N$	SLVT2940
295.	270 $N2 = N1 - 1$	SLVT2950
296.C		SLVT2960
297.C	--- REWIND ALL INPUT TAPES	SLVT2970
298.	REWIND NIN	SLVT2980
299.	REWIND NT	SLVT2990
300.	REWIND NOUT	SLVT3000
301.C	-- WRITE THE SOLUTIONS ON TAPE	SLVT3010
302.C		SLVT3020
303.	$NT = 0$	SLVT3030
304.	DO 280 I0 = 1, M	SLVT3040
305.	$NS = NT + 1$	SLVT3050
306.	$NT = NT + N$	SLVT3060
307.	280 WRITE (NWT) TA(NN), NN = NS, NT)	SLVT3070
308.C		SLVT3080
309.	CALL TIMEV(AA2)	SLVT3090
310.	$BB = (AA2 - AA1) / 60.$	SLVT3100
311.	WRITE (6, 290) N, N, M, BB	SLVT3110
312.	290 FORMAT (4HD THE 15, 2H X 15, 12H MATRIX WITH 14, 35H RIGHT SIDES WAS	SLVT3120
313.	15 SOLVED DIRECTLY IN 18.3, 9H MINUTES.)	SLVT3130
314.	RETURN	SLVT3140
315.	300 WRITE (6, 310)	
316.	310 FORMAT (34HDSOLVIT. NOT ENOUGH CORE. HALT.)	
317.	STOP	
318.	END	SLVT3150

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50.111X

25 AUG 75 18

1. SUBROUTINE TIMEV(T)

2. T = 0.0

3. RETURN

4. END

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50.TSET		25 AUG 75 18
1.	SUBROUTINE TSETV	
2.	RETURN	
3.	END	

50.XYZ0		25 AUG 75 18	
1.	SUBROUTINE XYZ	XYZ	31
2.C		XYZ	10
3.C		XYZ	20
4.C	OVERLAY (PAN,1,1)		C
5.C	PROGRAM XYZ		C
6.C		XYZ	40
7.C	* CONTROL FOR X,Y,Z MATRICES COMPUTATION	XYZ	50
8.C		XYZ	60
9.	COMMON /D/ D1, D3, XMXJ, YMYJ, XMXJP1, YMYJP1, S	XYZ	70
10.	COMMON HEDR(10), CASE, NB, NNU	XYZ	80
11.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	XYZ	90
12.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	XYZ	100
13.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	XYZ	110
14.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	XYZ	120
15.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	XYZ	130
16.	COMMON NT, ND(11), NN, NUNA(5), TYPEA(5),	XYZ	140
17.	1 NER1, NER2, NMA, NSIGA, NSIGC,	XYZ	150
18.	2 NUNC(5), TYPEC(5), NLF(11), IEC, NSIGEC,	XYZ	160
19.	3 TYPEEC(5), NUNEC(5)	XYZ	170
20.	DOUBLE PRECISION HEDR, CASE	XYZ	180
21.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	XYZ	190
22.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	XYZ	200
23.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	XYZ	210
24.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	XYZ	220
25.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	XYZ	230
26.	REAL NN	XYZ	240
27.	LOGICAL PF	XYZ	250
28.C		XYZ	260
29.	COMMON /RNGWNG/ VA(500,2), VR(500,2), VAN(500), VAT(500)	XYZ	270
30.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELS(500),	XYZ	280
31.	1 SINA(500), COSA(500), XP(500), YP(500)	XYZ	290
32.	2 ,XWAKE(11), YWAKE(11)	XYZ	300
33.	COMMON /TL/ A(500), B(500), AX(500), AY(500), AZ(500),	XYZ	310
34.	1 CX(500), CY(500), CZ(500), AXV(500), AYV(500),	XYZ	320
35.	2 VN(500,5), VT(500,5), BON, IAC,	XYZ	330
36.	3 I, J, JJ, SJ, DS,	XYZ	340
37.	4 DX, DY, NI, XJ, YJ,	XYZ	350
38.	5 XK, LER, ENK, K, PF	XYZ	360
39.C		XYZ	370
40.C	* START	XYZ	380
41.	IF (BON) 50, 10, 50	XYZ	390
42.	10 IF (J-1) 60, 20, 60	XYZ	400
43.C	* J EQUAL I PATH	XYZ	410
44.	20 T1=.5*DELS(J)	XYZ	420
45.	SJ=T1/Y2(J)	XYZ	430
46.	IF (SJ-.08) 30, 30, 40	XYZ	440
47.	30 CALL XYZ1	XYZ	450
48.	GO TO 200	XYZ	460
49.	40 SJ=.08	XYZ	470
50.	CALL XYZ1	XYZ	480
51.	NI=33	XYZ	490
52.	T2=.08*Y2(J)	XYZ	500
53.	DS=(T1-T2)/32.	XYZ	510
54.	DX=DS*COSA(J)	XYZ	520
55.	DY=DS*SINA(J)	XYZ	530
56.	XJ=X2(J)+Y2*COSA(J)-DX	XYZ	540

57.	YJ=Y	XYZ	550
58.	CALL XYZ2	XYZ	560
59.	GO TO 190	XYZ	570
60.C		XYZ	580
61.C	* J NOT EQUAL I PATH	XYZ	590
62.C	* COMPUTE MINIMUM DISTANCE TO I MIDPOINT	XYZ	600
63.C		XYZ	610
64.C	OFF-BODY ...	XYZ	620
65.	50 JIP1 = J1 + 1	XYZ	630
66.	D1 = (XP(I)-X1(J1))**2 + (YP(I)-Y1(J1))**2	XYZ	640
67.	XMID = (X1(J1)+X1(JIP1))/2.0	XYZ	650
68.	YMID = (Y1(J1)+Y1(JIP1))/2.0	XYZ	660
69.	D2 = (XP(I)-XMID)**2 + (YP(I)-YMID)**2	XYZ	670
70.	D3 = (XP(I)-X1(JIP1))**2 + (YP(I)-Y1(JIP1))**2	XYZ	680
71.	GO TO 70	XYZ	690
72.C		XYZ	700
73.C	ON-BODY ...	XYZ	710
74.	60 JIP1 = J1 + 1	XYZ	720
75.	XMXJ = X2(I) - X1(J1)	XYZ	730
76.	YMYJ = Y2(I) - Y1(J1)	XYZ	740
77.	XMXJP1 = X2(I) - X1(JIP1)	XYZ	750
78.	YMYJP1 = Y2(I) - Y1(JIP1)	XYZ	760
79.	D1 = XMXJ**2 + YMYJ**2	XYZ	770
80.	D2 = (X2(I)-X2(J1))**2 + (Y2(I)-Y2(J1))**2	XYZ	780
81.	D3 = XMXJP1**2 + YMYJP1**2	XYZ	790
82.	70 S = SQRT((X1(JIP1) - X1(J1))**2 + (Y1(JIP1) - Y1(J1))**2)	XYZ	800
83.	IF (D1-D2) 90 , 90 , 80	XYZ	810
84.	80 IF (D2-D3) 110 , 110 , 100	XYZ	820
85.	90 IF (D1-D3) 120 , 120 , 100	XYZ	830
86.	100 DM=SQRT(D3)	XYZ	840
87.	GO TO 130	XYZ	850
88.	110 DM=SQRT(D2)	XYZ	860
89.	GO TO 130	XYZ	870
90.	120 DM=SQRT(D1)	XYZ	880
91.C	* COMPUTE NO. OF INTERVALS(NI) AND DELTA S (DS)	XYZ	890
92.C	FOR SIMPSON RULE INTEGRATION	XYZ	900
93.	130 IF (DM.EQ.0.0) GO TO 160	XYZ	910
94.	NI=8.*DELS(J1)/DM+.9	XYZ	920
95.	IF (NI) 140 , 140 , 150	XYZ	930
96.	140 NI=3	XYZ	940
97.	DS=DELS(J1)/2.	XYZ	950
98.	GO TO 180	XYZ	960
99.	150 NI=NI+NI	XYZ	970
100.	IF (NI-128) 170 , 160 , 160	XYZ	980
101.	160 NI=129	XYZ	990
102.	DS=DELS(J1)/128.	XYZ	1000
103.	GO TO 180	XYZ	1010
104.	170 XNI=NI	XYZ	1020
105.	DS=DELS(J1)/XNI	XYZ	1030
106.	NI=NI+1	XYZ	1040
107.	180 DX=DS*COSA(J)	XYZ	1050
108.	DY=DS*SYNA(J)	XYZ	1060
109.	190 XJ=X1(J1)-DX	XYZ	1070
110.	YJ=Y1(J1)-DY	XYZ	1080
111.	CALL XYZ2	XYZ	1090
112.	200 RETURN	XYZ	1101
113.C	200 CONTINUE		C

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114.

END

RV2 1110

50.XY22							25 AUG 75	18
1.		SUBROUTINE XYZ1					XYZ1	20
2.C							XYZ1	10
3.C							XYZ1	30
4.C		* COMPUTE X,Y,Z MATRICES FOR SJ LESS THAN OR EQUAL .08					XYZ1	40
5.C							XYZ1	50
6.	COMMON	HEDR(10),CASE	,NB	,NNU			XYZ1	60
7.	1	,FLG03	,FLG04	,FLG05	,FLG06	,FLG07	XYZ1	70
8.	2	,FLG08	,FLG09	,FLG10	,FLG11	,FLG12	XYZ1	80
9.	3	,FLG13	,FLG14	,FLG15	,FLG16	,FLG17	XYZ1	90
10.	4	,FLG18	,FLG19	,FLG20	,FLG21	,FLG22	XYZ1	100
11.	5	,FLG23	,FLG24	,FLG25	,FLG26	,FLG27	XYZ1	110
12.	COMMON	NY,	ND(11),	MN,	NUNA(5),	TYPEA(5),	XYZ1	120
13.	1	NER1,	NER2,	NMA,	NSIGA,	NSIGC,	XYZ1	130
14.	2	NUNC(5),	TYPEC(5),	NLF(11),	IEC,	NSIGFC,	XYZ1	140
15.	3	TYPEEC(5),	NUNEC(5)				XYZ1	150
16.	DOUBLE PRECISION	HEDR,CASE					XYZ1	160
17.	INTEGER	FLG03	,FLG04	,FLG05	,FLG06	,FLG07	XYZ1	170
18.	1	,FLG08	,FLG09	,FLG10	,FLG11	,FLG12	XYZ1	180
19.	2	,FLG13	,FLG14	,FLG15	,FLG16	,FLG17	XYZ1	190
20.	3	,FLG18	,FLG19	,FLG20	,FLG21	,FLG22	XYZ1	200
21.	4	,FLG23	,FLG24	,FLG25	,FLG26	,FLG27	XYZ1	210
22.	COMMON	/RNGWNG/	VA(500,2),	VR(500,2),	VAN(500),	VAT(500)	XYZ1	220
23.	COMMON	/ECF/	ECX(500),	ECY(500),	ECZ(500)		XYZ1	230
24.	REAL	MN					XYZ1	240
25.	LOGICAL	PF					XYZ1	250
26.C							XYZ1	260
27.	COMMON /CL/	X1(500),	Y1(500),	X2(500),	Y2(500),	DELS(500),	XYZ1	270
28.	1	SINA(500),	COSA(500),	XP(500),	YP(500)		XYZ1	280
29.	2	,XWAKE(11),	YWAKE(11)				XYZ1	290
30.	COMMON /TL/	A(500),	B(500),	AX(500),	AY(500),	AZ(500),	XYZ1	300
31.	1	CX(500),	CY(500),	CZ(500),	AXV(500),	AYV(500),	XYZ1	310
32.	2	VN(500,5),	VT(500,5),	BON,		IAC,	XYZ1	320
33.	3	I,	J,	JI,	SJ,	DS,	XYZ1	330
34.	4	DX,	DY,	NI,	XJ,	YJ,	XYZ1	340
35.	5	XX,	EEK,	EKK,	K,	PF	XYZ1	350
36.	COMMON	/PPINTF/	PRIN1,PRIN2,PRIN3				XYZ1	360
37.	LOGICAL	PRIN1,PRIN2,PRIN3					XYZ1	370
38.C							XYZ1	380
39.C		* START					XYZ1	390
40.C		* INITIALIZE					XYZ1	400
41.	T1=	SJ*SJ					XYZ1	410
42.	T2=	ALOG(SJ/8.)					XYZ1	420
43.	T3=	SINA(J)*SINA(J)					XYZ1	430
44.	T4=	T2+T3					XYZ1	440
45.	T5=	.66666667 *T3					XYZ1	450
46.	T6=	T5*T3					XYZ1	460
47.	T7=	SJ+SJ					XYZ1	470
48.	T8=	T7+T7					XYZ1	480
49.	T9=	6.283185 *COSA(J)					XYZ1	490
50.	T10=	6.283185 *SINA(J)					XYZ1	500
51.	T11=	T1*SJ					XYZ1	510
52.	T14 =	.3333333 * (16.C + 6.0 * T3) + 2.0 * T2					XYZ1	520
53.	IF	(IEC.EQ.-1) GO TO 10					XYZ1	530
54.C***	***EXTRA CROSS FLOW	1ST TERM OF X(I,I), Y(I,I), Z(I,I)					XYZ1	540
55.	ECX(J) =	6.283185 * SINA(J) + 2.0 * SINA(J) * COSA(J) * SJ					XYZ1	550
56.	ECY(J) =	-6.283185 * COSA(J) + SJ * T14					XYZ1	560

57.	ECZ(J) = -8.0 * (1.666667 * T2) * SJ	XYZ1 570
58.	IF (IEC) 10 , 70 , 13	XYZ1 580
59.	10 IF (PF) 60 TO 30	XYZ1 590
60.	IF (IAC) 40 , 20 , 20	XYZ1 600
61.C	* AXIS FLOW	XYZ1 610
62.	20 AX(J) = T10 * SINA(J) * COSA(J) * (T7 + T4 + 2.166667 * T11 / 12.)	XYZ1 620
63.	AY(J) = T7 * T4 - T9 - (T1 * T2 - T3 - T6) * T11 / 8.	XYZ1 630
64.	T12 = T1 + T1	XYZ1 640
65.	AZ(J) = V2(J) * T8 * T11 - T2 * T1 * (2. - T12 * 3. * T2 * (1. + T12)) / 144.	XYZ1 650
66.	30 IF (IAC) 40 , 40 , 50	XYZ1 660
67.C	* CROSS FLOW	XYZ1 670
68.	40 T13 = T1 / 16.	XYZ1 680
69.	CX(J) = T10 * 2. * SINA(J) * SJ * COSA(J) * (1. - T13 * (3. - T5 + T2 + T2))	XYZ1 690
70.	CY(J) = -T9 * T7 * (2. + T4 + T13 * (1. - 4.777778 * T3 + T6 + T2 * (3. - 2.666667 * T3)))	XYZ1 700
71.	1 T3)))	XYZ1 710
72.	CZ(J) = -T8 * (1. + T2 - T13 * (1.111111 * T3 + T2 * (T5 - 1.)))	XYZ1 720
73.	50 IF (PF) 60 TO 60	XYZ1 730
74.	IF (FLG15 .LE. C.O.R.NLF(K).GT.J) 60 TO 70	XYZ1 740
75.	60 AXV(J) = T9 * T7 * (T2 - T3) + T11 * (T2 * (T2 * T3 - 9.))	XYZ1 750
76.	1 - 9. + 23. * T3 - 6. * T3 * T3 / 72.	XYZ1 760
77.	AYV(J) = T10 * 2. * COSA(J) * SINA(J) * (SJ - T11 * (6. * T2 + 9. - 2. * T3) / 48.)	XYZ1 770
78.	IF (.NOT. PF) 60 TO 70	XYZ1 780
79.	AX(J) = AXV(J)	XYZ1 790
80.	AY(J) = AYV(J)	XYZ1 800
81.C		XYZ1 810
82.C***	* RING WING OPTION PV EFFECTS ON ITSELF NEGLECTS 2*PI TERMS	XYZ1 820
83.C		XYZ1 830
84.	IF (FLG23 .LE. D160 TO 70	XYZ1 840
85.	AX(J) = AX(J) - T9	XYZ1 850
86.	AY(J) = AY(J) - T10	XYZ1 860
87.	AYV(J) = AYV(J)	XYZ1 870
88.	AXV(J) = AXV(J)	XYZ1 880
89.	70 CONTINUE	XYZ1 890
90.C		XYZ1 900
91.	IF (PRIN3) WRITE (6, 80) J, SJ, AX(J), AY(J), CX(J), CY(J), CZ(J), AXV(J)	XYZ1 910
92.	1), AYV(J)	XYZ1 920
93.	RETURN	XYZ1 930
94.	80 FORMAT(9H XYZ1. J=,I3,5H, SJ=,F8.5,5H, AX=,F9.5,5H, AY=,F9.5,	XYZ1 940
95.	1 5H, CX=,F9.5,5H, CY=,F9.5,5H, CZ=,F9.5,6H, AXV=,F9.5,6H, AYV=,	XYZ1 950
96.	2 F9.5)	XYZ1 960
97.	END	XYZ1 970

50.XYZ3		25 AUG 75 18	
1.	SUBROUTINE XYZ2	XYZ2	20
2.C		XYZ2	10
3.C		XYZ2	30
4.C	* COMPUTE X,Y,Z MATRICES USING SIMPSON RULE INTEGRATION	XYZ2	40
5.C		XYZ2	50
6.	REAL LIJ2D	XYZ2	60
7.	COMMON /D/ R1SQ, R2SQ, XHXJ, YHYJ, XHXJP1, YHYJP1, S	XYZ2	70
8.	COMMON HEDR(10), CASE, NB, NNU	XYZ2	80
9.	1 ,FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	XYZ2	90
10.	2 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	XYZ2	100
11.	3 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	XYZ2	110
12.	4 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	XYZ2	120
13.	5 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	XYZ2	130
14.	COMMON NT, ND(11), MN, NUNA(5), TYPEA(5),	XYZ2	140
15.	1 NER1, NER2, NHA, NSIGA, NSTGC,	XYZ2	150
16.	2 NUNC(5), TYPEC(5), NLF(11), IEC, NSTGEC,	XYZ2	160
17.	3 TYPEFC(5), NUNEC(5)	XYZ2	170
18.	DOUBLE PRECISION HEDR, CASE	XYZ2	180
19.	INTEGER FLG03 ,FLG04 ,FLG05 ,FLG06 ,FLG07	XYZ2	190
20.	1 ,FLG08 ,FLG09 ,FLG10 ,FLG11 ,FLG12	XYZ2	200
21.	2 ,FLG13 ,FLG14 ,FLG15 ,FLG16 ,FLG17	XYZ2	210
22.	3 ,FLG18 ,FLG19 ,FLG20 ,FLG21 ,FLG22	XYZ2	220
23.	4 ,FLG23 ,FLG24 ,FLG25 ,FLG26 ,FLG27	XYZ2	230
24.	COMMON /ECF/ ECX(500), FCY(500), ECZ(500)	XYZ2	240
25.	COMMON /RNGWNG/ VA(500,2), VR(500,2), VAN(500), VAT(500)	XYZ2	250
26.	COMMON /EPSBLK/ EPSLON		
27.	COMMON /PRINTF/ PRIN1,PRIN2,PRIN3	XYZ2	260
28.	LOGICAL PRIN1,PRIN2,PRIN3	XYZ2	270
29.	LOGICAL RSMALL	XYZ2	300
30.	REAL MN	XYZ2	310
31.	LOGICAL PF	XYZ2	320
32.C		XYZ2	330
33.	COMMON /CL/ X1(500), Y1(500), X2(500), Y2(500), DELS(500),	XYZ2	340
34.	1 SINA(500), COSA(500), XP(500), YP(500)	XYZ2	350
35.	2 ,XWAKE(11), YWAKE(11)	XYZ2	360
36.	COMMON /TL/ A(500), B(500), AX(500), AY(500), AZ(500),	XYZ2	370
37.	1 CX(500), CY(500), CZ(500), AXV(500), AYV(500),	XYZ2	380
38.	2 VN(500,5), VT(500,5), BON, IAC,	XYZ2	390
39.	3 I, J, J1, SJ, DS,	XYZ2	400
40.	4 DX, DY, NI, XJ, YJ,	XYZ2	410
41.	5 XK, EEK, ENK, K, PF	XYZ2	420
42.	COMMON /BLOCK3/NOAXI, NOCR05, NOVORT, NOV1, NOV2, FIRSTE, LASTE, L9SE, SO,	XYZ2	430
43.	1 NSMALL	XYZ2	440
44.	DIMENSION VDACIX(129), VDACIY(129), VDCRSX(129), VDCRSY(129),	XYZ2	450
45.	1 VDCRSZ(129), VOVORX(129), VOVORY(129), XRING(129), YRING(129)	XYZ2	460
46.	DATA NSW /1/	XYZ2	280
47.C		XYZ2	470
48.C***	***RSMALL WILL BE TRUE IF IS .LT. EPSLON. AND THEREFORE SMALL EL	XYZ2	290
49.C	* START	XYZ2	480
50.C	* INITIALIZE	XYZ2	490
51.	ASSIGN 650 TO K1	XYZ2	500
52.C***	***K5 = 80 FOR NON-SMALL ELEMENT AXISYMMETRIC	XYZ2	510
53.	ASSIGN 270 TO K5	XYZ2	520
54.C***	***K6 = 295 FOR NON SMALL ELEMENT CROSS FLOW	XYZ2	530
55.	ASSIGN 450 TO K6	XYZ2	540
56.	IF (FLG15.LE.0.OR.NLF(K).GT.3) GO TO 10	XYZ2	550

57.	ASSIGN 510 TO K1	XY22 560
58.	10 S2=.6666667 *DS	XY22 570
59.	S1 = .3333333 * DS	XY22 580
60.	S3 = 8.3/3.0 * S1	XY22 590
61.	S5 = .3333333 * S1	XY22 600
62.	S4 = S2+S2	XY22 610
63.	T1=V2(I1)*V2(I1)	XY22 620
64.	ASSIGN 210 TO K2	XY22 630
65.	ASSIGN 500 TO K3	XY22 640
66.	ASSIGN 650 TO K4	XY22 650
67.	IF1 .NOT. PF 1 GO TO 20	XY22 660
68.	ASSIGN 320 TO K2	XY22 670
69.	ASSIGN 510 TO K3	XY22 680
70.	ASSIGN 640 TO K4	XY22 690
71.	20 IF (I1 .NE. J1) .OR. (BON .NE. D.O1) GO TO 30	XY22 700
72.C***	***I = J ** ON BODY	XY22 710
73.	R = DELS(I1) / 2.0	XY22 720
74.	RSMALL = (R / V2(I1)) .LT. EPSLON	XY22 730
75.	NSW = 2	XY22 740
76.	GO TO 50	XY22 750
77.	30 R = SORT(AMAX1(R1SOR,R2SOR))	XY22 760
78.	IF(ABS(V2(I1)) .LT. 10E-30)GO TO 40	XY22 770
79.	RSMALL = (R / V2(I1)) .LT. EPSLON	XY22 780
80.	GO TO 50	XY22 790
81.	40 RSMALL = .FALSE.	XY22 800
82.	50 IF1 .NOT. RSMALL) GO TO 130	XY22 810
83.	NSMALL = NSMALL + 1	XY22 820
84.C***	***SMALL ELEMENT -- FORM XIJ2D, VIJ2D, LIJ	XY22 830
85.C		XY22 840
86.C***	***K5 = 105 FOR SMALL ELEMENT AXISYMMETRIC	XY22 850
87.	ASSIGN 500 TO K5	XY22 860
88.C***	***K6 = 320 FOR SMALL ELEMENT CROSS FLOW	XY22 870
89.	ASSIGN 470 TO K6	XY22 880
90.C***	***NSW = 1 FOR I NE J	XY22 890
91.C***	***NSW = 2 FOR I EQ J 1ST TIME THROUGH	XY22 900
92.C***	***NSW = 3 FOR I EQ J 2ND TIME THROUGH	XY22 910
93.	GO TO (90 , 60 , 70), NSW	XY22 920
94.C		XY22 930
95.C***	***I = J 1ST TIME THROUGH	XY22 940
96.	60 XLEFT = XJ + DX	XY22 950
97.	VLEFT = YJ + DY	XY22 960
98.	JIP1 = J + 1	XY22 970
99.	XRIGHT = XI(JIP1)	XY22 980
100.	YRIGHT = YI(JIP1)	XY22 990
101.C***	***GET NSW READY FOR I = J 2ND TIME THROUGH	XY221000
102.	NSW = 3	XY221010
103.	GO TO 80	XY221020
104.C***	***I = J 2ND TIME THROUGH	XY221030
105.	70 XLEFT = XI(J1)	XY221040
106.	VLEFT = YI(J1)	XY221050
107.	XRIGHT = XLEFT + 32.0 * DX	XY221060
108.	YRIGHT = VLEFT + 32.0 * DY	XY221070
109.	NSW = 1	XY221080
110.C***	***CALCULATE QUANTITIES WHICH HAVE NOT YET BEEN CALCULATED FOR I=4	XY221090
111.	80 XHXJ = X2(I1) - XLEFT	XY221100
112.	YHYJ = Y2(I1) - VLEFT	XY221110
113.	XHXJP1 = X2(I1) - XRIGHT	XY221120

114.	YHYJP1 = Y2(I) - YRIGHT	XY221130
115.	RLEFT = R	XY221140
116.	RRIGHT = R	XY221150
117.	S = SORT((XLEFT - XRIGHT)**2 + (YLEFT - YRIGHT)**2)	XY221160
118.	GO TO 120	XY221170
119.C**	***1 NE J SMALL ELEMENT	XY221180
120.	90 RLEFT = R1SOR	XY221190
121.	RRIGHT = R2SOR	XY221200
122.C**	***NOW FORM XIJ2D, YIJ2D, LIJ	XY221210
123.	100 H = (-XMXJ + SINA(J)) + (YHYJ + COSA(J))	XY221220
124.	EL1 = (XMXJ + COSA(J)) + (YHYJ + SINA(J))	XY221230
125.	EL2 = (XMYJP1 + COSA(J)) + (YHYJP1 + SINA(J))	XY221240
126.	DPHIDX = -ALOG (RLEFT / RRIGHT)	XY221250
127.	IF (ABS(H/EL1) .LT. 10.DF-10) GO TO 110	XY221260
128.	DPHIDY = -2.0 * (ATAN(EL1/H) - ATAN(EL2/H))	XY221270
129.	GO TO 120	XY221280
130.	110 DPHIDY = 0.0	XY221290
131.	IF ((EL1 + EL2) .LT. 0.0) DPHIDY = -6.283186	XY221300
132.	120 XIJ2D = (COSA(J)*DPHIDX) - (SINA(J)*DPHIDY)	XY221310
133.	YIJ2D = (SINA(J)*DPHIDX) + (COSA(J)*DPHIDY)	XY221320
134.	LIJ2D = ((-1/EL1 + EL2) / 4.0) * DPHIDX	XY221330
135.	1 * ((S/4.0) * ALOG((RLEFT*RRIGHT) / (4096.0 * T1**2)))	XY221340
136.	2 -S - ((H/2.0) * DPHIDY)	XY221350
137.C	* NO. OF INTERVAL LOOP	XY221360
138.	130 DO 780 IS=1,N1	XY221370
139.	XJ=XJ+DX	XY221380
140.	YJ=YJ+DY	XY221390
141.	XRING(IS) = XJ	XY221400
142.	YRING(IS) = YJ	XY221410
143.	T2=YJ*YJ	XY221420
144.	T3=X2(I1)-XJ	XY221430
145.	T4=T3*T3	XY221440
146.	T5=(Y2(I1)+YJ)**2	XY221450
147.	T6=T4+T5	XY221460
148.	T7=SORT(T6)	XY221470
149.	T8=T2+T4	XY221480
150.	T9A = Y2(I) - YJ	XY221490
151.	T9 = T9A**2	XY221500
152.	T10=T9+T4	XY221510
153.	T10A = SQR(T10)	XY221520
154.C		XY221530
155.C	*** IF DENOM (T8) IS ZERO THEN MAKE T21 FAIL ALL TESTS	XY221540
156.C		XY221550
157.	IF (ABS(T8) .LT. 10.DF-30) GO TO 140	XY221560
158.	T21 = SORT(T1 / T8)	XY221570
159.	GO TO 150	XY221580
160.	140 T21 = 0.10	XY221590
161.C	* COMPUTE ELLIPIC INTEGRAL	XY221600
162.	150 IF (RSMALL .AND. FLG21 .EQ. 0) GO TO 160	XY221610
163.	XK=4.*YJ*Y2(I)/T6	XY221620
164.	CALL FLIP	XY221630
165.	IF (JEC) 160 , 660 , 160	XY221640
166.	160 IF (IAC) 330 , 170 , 170	XY221650
167.C	* AXIS FLOW	XY221660
168.	170 IF (RSMALL) GO TO 190	XY221670
169.	T11 = YJ/T7	XY221680
170.	IF (T21.LT.0.01) GO TO 180	XY221690

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171.	T12 = VJ/Y2(I)	XY221700
172.	FV2 = (EKK*EEK*(T1-T8)/Y13)/T7	XY221710
173.	FV3 = Y2(I)/T10 * T3/T7 * EEK	XY221720
174.	F1 = FV3*T12	XY221730
175.	F2 = FV2*T12	XY221740
176.	FV4 = FV2*T3/Y2(I)	XY221750
177.	F3=Y11*EEK	XY221760
178.	GO TO 200	XY221770
179.	180 FV2 = 0.	XY221780
180.	FV3 = 0.	XY221790
181.	FV4 = 0.	XY221800
182.C***	***SMALL Y FORMULAS AXISYMMETRIC FLOW	XY221810
183.	T23 = T1 / T8**2	XY221820
184.	T24 = 2.0 * T4 - T2	XY221830
185.	F1 = ((1.570796 * VJ * T3) / (T8**1.5)) *	XY221840
186.	1 (1.0 + 1.75 * (3.0 * T2 - 2.0 * T4) * T23))	XY221850
187.	F2 = (1.570796 * VJ * Y2(I)) * (T24 / (T8**2.5))	XY221860
188.	F3 = 1.570796 * VJ * (1.0 + 1.25 * T23 * (-T24)) / SQRT(T8)	XY221870
189.	GO TO 200	XY221880
190.	190 T32 = T3 / T10A	XY221890
191.	T33 = T9A / T10A	XY221900
192.	T34 = T33**2	XY221910
193.	T35A = T10A / (8.0 * Y2(I))	XY221920
194.	T35 = ALOG(T35A)	XY221930
195.	T36 = T9A/Y2(I)	XY221940
196.	T40 = T10A / Y2(I)	XY221950
197.	T37 = T40**2)*0.125	XY221960
198.	T38 = 0.250*T36*T35	XY221970
199.	T39 = 0.125*T36	XY221980
200.	T34A = 2.0*T34	XY221990
201.	T34B = T34A * 3.0	XY222000
202.	F1 = (-2.0 * T32 * (1-T35A * T35) - 10.5 * T33)	XY222010
203.	1 - (T40/16.0) * T34B)) / Y2(I)	XY222020
204.	F2 = -1 10.25 * T36 * T35) - T34 - 1.0 - (T39 * T34B)) / Y2(I)	XY222030
205.	F3 = (T35 * (T36 * (0.25 * Y36**2) + T37)) - T36 + T37	XY222040
206.	200 GO TO K2, (210 , 320)	XY222050
207.C	* SIMPSON RULE INTEGRATION	XY222060
208.	210 IF (IS-1) 220 , 220 , 230	XY222070
209.C	* FIRST PASS	XY222080
210.	220 AXS=F1	XY222090
211.	AYS=F2	XY222100
212.	AZS=F3	XY222110
213.	V0AXIX(IIS) = -4.*F1	XY222120
214.	V0AXIY(IIS) = -2.*F2	XY222130
215.	IA=0	XY222140
216.	GO TO 320	XY222150
217.	230 IF (IS.EQ.NI) GO TO 260	XY222160
218.	IF (IA) 250 , 240 , 250	XY222170
219.C	* EVEN PASS	XY222180
220.	240 AXS=AXS+4.*F1	XY222190
221.	AYS=AYS+4.*F2	XY222200
222.	AZS=AZS+4.*F3	XY222210
223.	V0AXIX(IIS) = -4.*F1	XY222220
224.	V0AXIY(IIS) = -2.*F2	XY222230
225.	IA=1	XY222240
226.	GO TO 320	XY222250
227.C	* ODD PASS	XY222260

228.	250	AXS=AXS+F1+F1	XY222270
229.		AYS=AYS+F2+F2	XY222280
230.		AZS=AZS+F3+F3	XY222290
231.		VDAXIX(IIS) = -4.*F1	XY222300
232.		VDAXIY(IIS) = -2.*F2	XY222310
233.		IA=0	XY222320
234.		GO TO 320	XY222330
235.	260	GO TO K5, (270 , 300)	XY222340
236.C		* LAST PASS	XY222350
237.	270	IF (J-I) 290 , 280 , 290	XY222360
238.	280	IF (BON.NE.O.O) GO TO 290	XY222370
239.		AX(IJ)=AX(IJ)-54*(AXS+F1)	XY222380
240.		AY(IJ)=AY(IJ)-52*(AYS+F2)	XY222390
241.		AZ(IJ)=AZ(IJ)+54*(AZS+F3)	XY222400
242.		VDAXIX(IIS) = -4.*F1	XY222410
243.		VDAXIY(IIS) = -2.*F2	XY222420
244.		AXJ = -54*(AXS+F1)	XY222430
245.		AYJ = -52*(AYS+F2)	XY222440
246.		GO TO 320	XY222450
247.	290	AX(IJ)=-54*(AXS+F1)	XY222460
248.		AY(IJ)=-52*(AYS+F2)	XY222470
249.		AZ(IJ)=54*(AZS+F3)	XY222480
250.		VDAXIX(IIS) = -4.*F1	XY222490
251.		VDAXIY(IIS) = -2.*F2	XY222500
252.		AXJ = AX(IJ)	XY222510
253.		AYJ = AY(IJ)	XY222520
254.		GO TO 320	XY222530
255.C***		***LAST PASS * SMALL ELEMENT	XY222540
256.	300	IF (J.NE.1) .OR. (BON.NE.O.O) GO TO 310	XY222550
257.C***		***I = J ON BODY	XY222560
258.		AX(IJ) = AX(IJ) + XIJ2D + (AXS + F1) * S1	XY222570
259.		AY(IJ) = AY(IJ) + YIJ2D + (LIJ2D / Y2(I)) + (AYS + F2) * S1	XY222580
260.		AZ(IJ) = AZ(IJ) - (2.0 * LIJ2D) + (AZS + F3) * S1	XY222590
261.		VDAXIX(IIS) = -99.	XY222600
262.		VDAXIY(IIS) = -99.	XY222610
263.		AXJ = XIJ2D + (AXS+F1)*S1	XY222620
264.		AYJ = YIJ2D + (LIJ2D/Y2(I)) + (AYS+F2)*S1	XY222630
265.		GO TO 320	XY222640
266.C***		***I NE J ON OR OFF BODY	XY222650
267.	310	AX(IJ) = XIJ2D + (AXS + F1) * S1	XY222660
268.		AY(IJ) = YIJ2D + (LIJ2D / Y2(I)) + (AYS + F2) * S1	XY222670
269.		AZ(IJ) = -2.0 * LIJ2D + (AZS + F3) * S1	XY222680
270.		VDAXIX(IIS) = -99.	XY222690
271.		VDAXIY(IIS) = -99.	XY222700
272.		AXJ = AX(IJ)	XY222710
273.		AYJ = AY(IJ)	XY222720
274.	320	IF (IAC) 330 , 330 , 490	XY222730
275.C		* CROSS FLOW	XY222740
276.	330	IF (RSMALL)GO TO 350	XY222750
277.		IF (Y21 .LT. D.O4)GO TO 340	XY222760
278.		T12 = T1 + T8	XY222770
279.		F1=T3/Y2(I)*(EKK-EKK*T12/T10)/T7	XY222780
280.		F2=(EEK*(T8+T8+T1*(T4-T2))/T10-EKK*T8)/T1/T7	XY222790
281.		F3=T7*(EKK*T12/T6-EKK)/T1	XY222800
282.		GO TO 380	XY222810
283.C***		***SMALL Y FORMULAS * CROSS FLOW	XY222820
284.	340	T23 = T1 / T8**2	XY222830

285.	$T29 = (1.570796 * T2) / (18 * 1.5)$	XY222840
286.	$T26 = 4.0 * T4 - T2$	XY222850
287.	$T31 = T26 * T23$	XY222860
288.	$F1 = (1 - 4.712389) * T2 * T3 * Y2(I) / (18 * 2.5)$	XY222870
289.	$T2 = T29 * (1.0 - (1.125 * T31))$	XY222880
290.	$F3 = T29 * (1.0 - (1.375 * T31))$	XY222890
291.	GO TO 380	XY222900
292.C**	***IAC LY 0 MEANS NO AXISYMMETRIC FLOW	XY222910
293.	35H IF (IAC) 360, 370, 370	XY222920
294.C**	***CALCULATE SMALL ELEMENT QUANTITIES THAT DID NOT GET CALCULATED	XY222930
295.C**	***BECAUSE THERE WAS NO AXISYMMETRIC FLOW	XY222940
296.	360 $T32 = T3 / T10A$	XY222950
297.	$T33 = T9A / Y10A$	XY222960
298.	$T34 = T33 * 2$	XY222970
299.	$T35A = Y10A / (8.0 * Y2(I))$	XY222980
300.	$T35 = ALOG(T35A)$	XY222990
301.	$T36 = T9A / Y2(I)$	XY223000
302.	$T40 = Y10A / Y2(I)$	XY223010
303.	$T37 = (T40 * 2) * 0.125$	XY223020
304.	$T38 = 0.25 * T36 * T35$	XY223030
305.C**	***CALCULATE SMALL ELEMENT F1,F2,F3 CROSS FLOW	XY223040
306.	37H $T38A = -5.0 * T38$	XY223050
307.	$T40A = T40 * 2$	XY223060
308.	$T36A = T36 * 2$	XY223070
309.	$F1 = (T32 / Y2(I)) * ((-0.75 * T40 * T35) + T33$	XY223080
310.	$+ 10.125 * T40 * (2.0 * T34 - 5.0)) / Y2(I)$	XY223090
311.	$F2 = (T38A + T34 * 3.0 + 10.25 * T36 * (T34 - 6.50)) / Y2(I)$	XY223100
312.	$F3 = ((T36 - (0.375 * T40A) - 10.25 * T36A) * T35 - 4.0 * T36$	XY223110
313.	$- (0.50 * T36A) - T37) / Y2(I)$	XY223120
314.C	* SIMPSON RULE INTEGRATION	XY223130
315.	380 IF (IS-1) 390, 390, 400	XY223140
316.C	* FIRST PASS	XY223150
317.	390 $CXS=F1$	XY223160
318.	$CYS=F2$	XY223170
319.	$CZS=F3$	XY223180
320.	$IC=0$	XY223190
321.	$VDCRSX(I) = 2. * F1$	XY223200
322.	$VDCRSY(I) = 2. * F2$	XY223210
323.	$VDCRSZ(I) = 2. * F3$	XY223220
324.	GO TO 490	XY223230
325.	400 IF (IS-N1) 410, 440, 410	XY223240
326.	410 IF (IC) 430, 420, 430	XY223250
327.C	* EVEN PASS	XY223260
328.	420 $CXS=CXS+4. * F1$	XY223270
329.	$CYS=CYS+4. * F2$	XY223280
330.	$CZS=CZS+4. * F3$	XY223290
331.	$VDCRSX(I) = 2. * F1$	XY223300
332.	$VDCRSY(I) = 2. * F2$	XY223310
333.	$VDCRSZ(I) = 2. * F3$	XY223320
334.	$IC=1$	XY223330
335.	GO TO 490	XY223340
336.C	* ODD PASS	XY223350
337.	430 $CXS=CXS+F1 * F1$	XY223360
338.	$CYS=CYS+F2 * F2$	XY223370
339.	$CZS=CZS+F3 * F3$	XY223380
340.	$VDCRSX(I) = 2. * F1$	XY223390
341.	$VDCRSY(I) = 2. * F2$	XY223400

342.	VDCRS7(IIS) = 2.*F3	XY223410
343.	IC=0	XY223420
344.	GO TO 490	XY223430
345.	440 GO TO K6,(450 , 470)	XY223440
346.C	* LAST PASS	XY223450
347.	450 IF(IJ .NE. I)GO TO 460	XY223460
348.	IF (BON.NE.D.D) GO TO 460	XY223470
349.	CX(IJ)=CX(IJ)+S2*(ICXS+F1)	XY223480
350.	CY(IJ)=CY(IJ)+S2*(CYS+F2)	XY223490
351.	CZ(IJ)=CZ(IJ)+S2*(CZS+F3)	XY223500
352.	VDCRSX(IIS) = 2.*F1	XY223510
353.	VDCRSY(IIS) = 2.*F2	XY223520
354.	VDCRSZ(IIS) = 2.*F3	XY223530
355.	CXJ = S2*(ICXS+F1)	XY223540
356.	CYJ = S2*(CYS+F2)	XY223550
357.	CZJ = S2*(CZS+F3)	XY223560
358.	GO TO 490	XY223570
359.	460 CX(IJ)=S2*(ICXS+F1)	XY223580
360.	CY(IJ)=S2*(CYS+F2)	XY223590
361.	CZ(IJ)=S2*(CZS+F3)	XY223600
362.	VDCRSX(IIS) = 2.*F1	XY223610
363.	VDCRSY(IIS) = 2.*F2	XY223620
364.	VDCRSZ(IIS) = 2.*F3	XY223630
365.	CXJ = CX(IJ)	XY223640
366.	CYJ = CY(IJ)	XY223650
367.	CZJ = CZ(IJ)	XY223660
368.	GO TO 490	XY223670
369.	470 IF ((I.NE.J) .OR. (BON.NE.D.D)) GO TO 480	XY223680
370.C***	**LAST PASS SMALL ELEMENT I=J ON BODY	XY223690
371.	CX(IJ) = CX(IJ) + XIJ2D + (CX5 + F1) * S1	XY223700
372.	CY(IJ) = CY(IJ) + YIJ2D + (LIJ2D / Y2(I)) + (CYS + F2) * S1	XY223710
373.	CZ(IJ) = CZ(IJ) - (2.0 * LIJ2D / Y2(I)) + (CZS + F3) * S1	XY223720
374.	VDCRSX(IIS) = -99.	XY223730
375.	VDCRSY(IIS) = -99.	XY223740
376.	VDCRSZ(IIS) = -99.	XY223750
377.	CXJ = XIJ2D + (CX5+F1)*S1	XY223760
378.	CYJ = YIJ2D + (LIJ2D/Y2(I)) + (CYS+F2)*S1	XY223770
379.	CZJ = -2.0*LIJ2D/Y2(I) + (CZS+F3)*S1	XY223780
380.	GO TO 490	XY223790
381.C***	**I NE J OR ANY OFF BODY	XY223800
382.	480 CX(IJ) = XIJ2D + (CX5 + F1) * S1	XY223810
383.	CY(IJ) = YIJ2D + (LIJ2D/Y2(I)) + (CYS + F2) * S1	XY223820
384.	CZ(IJ) = - (2.0 * LIJ2D / Y2(I)) + (CZS + F3) * S1	XY223830
385.	VDCRSX(IIS) = -99.	XY223840
386.	VDCRSY(IIS) = -99.	XY223850
387.	VDCRSZ(IIS) = -99.	XY223860
388.	CXJ = CX(IJ)	XY223870
389.	CYJ = CY(IJ)	XY223880
390.	CZJ = CZ(IJ)	XY223890
391.C***	**K3 = 420 FOR SURFACE VORTICITY PF TRUE	XY223900
392.	490 GO TO K3,(500 , 510)	XY223910
393.C***	**K1 = 420 FOR STRIP VORTEX	XY223920
394.	500 GO TO K1,(650 , 510)	XY223930
395.C***	**FLOW OF CONTROL REACHES HERE FOR (PF=TRUE) OR (IFLG15 GT 0 AND	XY223940
396.C***	**NLF LE 0 (LIFTING BODY)) AND (I NE J ON BODY OR ANY OFF BODY))	XY223950
397.	510 IF (RSMALL)GO TO 580	XY223960
398.	FV1 = (T2-T1) / T7 * ECK / T10	XY223970

399.	IF (IS.GT.1) GO TO 520	XYZ23980
400.C	* FIRST PASS	XYZ23990
401.	AX1 = FV1	XYZ24000
402.	AX2 = FV2	XYZ24010
403.	AY1 = FV3	XYZ24020
404.	AY2 = FV4	XYZ24030
405.	VGVORX(15) = -4.*FV1 - 2.*FV2	XYZ24040
406.	VGVORY(15) = -4.*FV3 + 2.*FV4	XYZ24050
407.	IV=0	XYZ24060
408.	GO TO 650	XYZ24070
409. 520	IF (IS.EQ.N1) GO TO 550	XYZ24080
410.	IF (IV) 540 , 530 , 540	XYZ24090
411.C	* EVEN PASS	XYZ24100
412. 530	AX1 = AX1+4.*FV1	XYZ24110
413.	AX2 = AX2+4.*FV2	XYZ24120
414.	AY1 = AY1+4.*FV3	XYZ24130
415.	AY2 = AY2+4.*FV4	XYZ24140
416.	VGVORX(15) = -4.*FV1 - 2.*FV2	XYZ24150
417.	VGVORY(15) = -4.*FV3 + 2.*FV4	XYZ24160
418.	IV=1	XYZ24170
419.	GO TO 650	XYZ24180
420.C	* ODD PASS	XYZ24190
421. 540	AX1 = AX1+FV1+FV1	XYZ24200
422.	AX2 = AX2+FV2+FV2	XYZ24210
423.	AY1 = AY1+FV3+FV3	XYZ24220
424.	AY2 = AY2+FV4+FV4	XYZ24230
425.	VGVORX(15) = -4.*FV1 - 2.*FV2	XYZ24240
426.	VGVORY(15) = -4.*FV3 + 2.*FV4	XYZ24250
427.	IV = 0	XYZ24260
428.	GO TO 650	XYZ24270
429.C	* LAST PASS	XYZ24280
430. 550	IF (J-I) 570 , 560 , 570	XYZ24290
431. 560	IF (BON.NF.G.) GO TO 570	XYZ24300
432.	AXV(J) = AXV(J) - S4*(AX1+FV1) - S2*(AX2+FV2)	XYZ24310
433.	AYV(J) = AYV(J) - S4*(AY1+FV3) + S2*(AY2+FV4)	XYZ24320
434.	VGVORX(15) = -4.*FV1 - 2.*FV2	XYZ24330
435.	VGVORY(15) = -4.*FV3 + 2.*FV4	XYZ24340
436.	AXVJ = -S4*(AX1+FV1) - S2*(AX2+FV2)	XYZ24350
437.	AYVJ = -S4*(AY1+FV3) + S2*(AY2+FV4)	XYZ24360
438.	GO TO 630	XYZ24370
439. 570	AXV(J) = -S4*(AX1+FV1) - S2*(AX2+FV2)	XYZ24380
440.	AYV(J) = -S4*(AY1+FV3) + S2*(AY2+FV4)	XYZ24390
441.	VGVORX(15) = -4.*FV1 - 2.*FV2	XYZ24400
442.	VGVORY(15) = -4.*FV3 + 2.*FV4	XYZ24410
443.	AXVJ = AXV(J)	XYZ24420
444.	AYVJ = AYV(J)	XYZ24430
445.	GO TO 630	XYZ24440
446. 580	T34C = T34B - 8.0	XYZ24450
447.	FV1 = (T38 + (T32**2) - (T39 + T34C)) / Y2(1)	XYZ24460
448.	FV2 = (T32 / Y2(1)) * ((-3.75 * T40 + T35) + T33	XYZ24470
449.	+ (T0.125 * T40 + T34C))	XYZ24480
450.	IF (IS .GT.1)GO TO 59C	XYZ24490
451.C***	***FIRST PASS SMALL ELEMENT	XYZ24500
452.	AX1 = FV1	XYZ24510
453.	AY1 = FV2	XYZ24520
454.	VGVORX(15) = -99.	XYZ24530
455.	VGVORY(15) = -99.	XYZ24540

456.	IV = 0	XY224550
457.	GO TO 650	XY224560
458.	590 IF (IS.EQ. NI) GO TO 610	XY224570
459.	IF (IV.NE. 0) GO TO 600	XY224580
460.C**	***EVEN PASS SMALL ELEMENT	XY224590
461.	AX1 = AX1 + 4.0* FV1	XY224600
462.	AY1 = AY1 + 4.0* FV2	XY224610
463.	VQVORX(1S) = -99.	XY224620
464.	VQVORY(1S) = -99.	XY224630
465.	IV = 1	XY224640
466.	GO TO 650	XY224650
467.C**	***ODD PASS SMALL ELEMENT	XY224660
468.	600 AX1 = AX1 + FV1 + FV1	XY224670
469.	AY1 = AY1 + FV2 + FV2	XY224680
470.	VQVORX(1S) = -99.	XY224690
471.	VQVORY(1S) = -99.	XY224700
472.	IV = 0	XY224710
473.	GO TO 650	XY224720
474.C**	***LAST PASS SMALL ELEMENT	XY224730
475.	610 IF ((1.NE. J) .OR. (BON.NE. 0.0)) GO TO 620	XY224740
476.C**	***I = J ON BODY	XY224750
477.	AXV(I) = AXV(I) - YIJ2D + (LIJ2D / Y2(I)) + (AX1 + FV1)*S1	XY224760
478.	AYV(I) = AYV(I) + XIJ2D + (AY1 + FV2)*S1	XY224770
479.	VQVORX(1S) = -99.	XY224780
480.	VQVORY(1S) = -99.	XY224790
481.	AXVJ = -YIJ2D + (LIJ2D/Y2(I)) + (AX1+FV1)*S1	XY224800
482.	AYVJ = XIJ2D + (AY1+FV2)*S1	XY224810
483.	GO TO 630	XY224820
484.C**	***I NE J OR ANY OFF BODY	XY224830
485.	620 AXV(I) = -YIJ2D + (LIJ2D / Y2(I)) + (AX1 + FV1)*S1	XY224840
486.	AYV(I) = XIJ2D + (AY1 + FV2)*S1	XY224850
487.	VQVORX(1S) = -99.	XY224860
488.	VQVORY(1S) = -99.	XY224870
489.	AXVJ = AXV(I)	XY224880
490.	AYVJ = AYV(I)	XY224890
491.C**	***K4 = 560 FOR SURFACE VORTICITY PF TRUE	XY224900
492.	630 GO TO K4, (640 , 650)	XY224910
493.C**	***FLOW OF CONTROL REACHES HERE IF PF IS TRUE	XY224920
494.	640 AXI(J) = AXV(I)	XY224930
495.	AY(J) = AYV(I)	XY224940
496.	VQVORX(1S) = -99.	XY224950
497.	VQVORY(1S) = -99.	XY224960
498.	650 IF (IEC.EQ.-1) GO TO 780	XY224970
499.	660 IF (T21.LT.0.08) GO TO 680	XY224980
500.	T20 = SQRT(T2 / (T1 + T4))	XY224990
501.	IF (T20.LT.0.01) GO TO 670	XY225000
502.	T13 = YJ * Y2(I)**2	XY225010
503.	T14 = T1 + T8	XY225020
504.	T15 = T2 * T1	XY225030
505.	T16 = T14 * T14	XY225040
506.	T17 = T1 * YJ	XY225050
507.	T18 = T1 * T1	XY225060
508.	T19 = T8 * T8	XY225070
509.	F3 = (T7/T13) * ((-T14) + EEK + ((T16 - T15) * FKK) / T6)	XY225080
510.	F1 = (T3 / (T17 + T7)) * ((EEK / T10) * (T16 - 3.0 * T15) -	XY225090
511.	1 (T14 + EEK))	XY225100
512.	TEMP1 = ((-8.0*T8**3) - (12.0*T1*T19) + (26.0*T15*T8)	XY225110

513.	1 + (2.0*Y18*(2.0*Y1 - 5.0*Y2)))* ECK/Y10	XY225120
514.	TEMP2 = ENK * ((8.5*Y19) + (4.0*Y1*Y8) - (2.0*Y15) - (4.0*Y18))	XY225130
515.	F2 = (TEMP1 + TEMP2) / (Y13 * Y7)	XY225140
516.	GO TO 690	XY225150
517.C**	***SMALL YJ FORMULAS * EXTRA CROSS FLOW	XY225160
518. 670	Y25 = YJ**3	XY225170
519.	Y30 = Y4 + Y1	XY225180
520.	Y27 = Y30**3.5	XY225190
521.	Y28 = Y25 * Y2(Y1)	XY225200
522.	F1 = (2.945243 * Y25 * Y3 * Y1) / Y27	XY225210
523.	F2 = (7.068584 * Y28 * (3.0 * Y1 - 2.0 * Y4)) / Y27	XY225220
524.	F3 = 1.767146 * Y28 / (Y30**2.5)	XY225230
525.	GO TO 690	XY225240
526.C**	***SMALL Y FORMULAS * EXTRA CROSS FLOW	XY225250
527. 680	Y25 = YJ**3	XY225260
528.	F1 = (2.945243 * Y25 * Y3 * Y1) / (Y8**3.5	XY225270
529.	F2 = ((-14.137(Y1) * Y25 * Y2(Y1)) / (Y8**2.5)	XY225280
530.	F3 = -F2 / 8.0	XY225290
531.C**	***SYMPSON'S RULE	XY225300
532. 690	IF (IS - 1) 700 , 700 , 710	XY225310
533.C**	***FIRST PASS	XY225320
534. 700	ECXS = F1	XY225330
535.	ECYS = F2	XY225340
536.	ECZS = F3	XY225350
537.	IE = 0	XY225360
538.	GO TO 780	XY225370
539. 710	IF (IS - NI) 720 , 750 , 720	XY225380
540. 720	IF (IE) 740 , 730 , 740	XY225390
541.C**	***EVEN PASS	XY225400
542. 730	ECXS = ECXS + 4.0 * F1	XY225410
543.	ECYS = ECYS + 4.0 * F2	XY225420
544.	ECZS = ECZS + 4.0 * F3	XY225430
545.	IE = 1	XY225440
546.	GO TO 780	XY225450
547.C**	***ODD PASS	XY225460
548. 740	ECXS = ECXS + F1 + F1	XY225470
549.	ECYS = ECYS + F2 + F2	XY225480
550.	ECZS = ECZS + F3 + F3	XY225490
551.	IE = 0	XY225500
552.	GO TO 780	XY225510
553.C**	***LAST PASS	XY225520
554. 750	IF (J - 1) 770 , 760 , 770	XY225530
555.C**	***I=J * ELEMENTS ON MAIN DIAGONAL	XY225540
556. 760	IF (BON.NE.D.O) GO TO 770	XY225550
557.	ECX(I) = ECX(I) -S4 * (ECXS + F1)	XY225560
558.	ECY(I) = ECY(I) -S5 * (ECYS + F2)	XY225570
559.	ECZ(I) = ECZ(I) +S3 * (ECZS + F3)	XY225580
560.	GO TO 780	XY225590
561.C**	***OFF MAIN DIAGONAL OR OFF BODY POINTS	XY225600
562. 770	ECX(I) = -S4 * (ECXS + F1)	XY225610
563.	ECY(I) = -S5 * (ECYS + F2)	XY225620
564.	ECZ(I) = S3 * (ECZS + F3)	XY225630
565. 780	CONTINUE	XY225640
566.	IF (.NOT. PRIN3) RETURN	XY225650
567.	WRITE (6, 810) I,J,NI,DS,X2(I),Y2(I)	XY225660
568.	WRITE (6, 790) (L,XRING(L),YRING(L),VQAXIX(L),VQAXIY(L),	XY225670
569.	I VQCRSX(L),VQCRSY(L),VQCRSZ(L),VQVORX(L),VQVORY(L),L=1,NI)	XY225680

570.	WRITE (6, 800) AXJ,AYJ,CXJ,CYJ,CZJ,AXVJ,AYVJ	XYZ25690
571.	RETURN	XYZ25700
572.C		XYZ25710
573.C		XYZ25720
574.	790 FORMAT(4H0 L,7X,5HXRING,8X,5HYRING,10X,6HVDAXIX,7X,6HVDAXIY,	XYZ25730
575.	1 10X,6HVDCRSX,7X,6HVDCRSY,7X,6HVDCRSZ,10X,6HVDUORX,7X,6HVDVORY//	XYZ25740
576.	2 11H ,13,2F13.5,3X,2F13.6,3X,3F13.6,3X,2F13.6))	XYZ25750
577.	800 FORMAT(24H0RESULTS OF SIMPSON-RULE,9X,2F13.6,3X,3F13.6,3X,2F13.6,	XYZ25760
578.	1 71H01	XYZ25770
579.	810 FORMAT(12H0XYZ22. I=,13,4H, J=,13,5H, NI=,13,5H,	XYZ25780
580.	1 5H, DSE=,F10.6,7H, X(I)=,F10.5,7H, Y(I)=,F10.5)	XYZ25790
581.	END	XYZ25800

Program COMBYN

50.COMBYN		317	177	16
1.C	THE MAIN PROGRAM FOR APPROACH 5 COMBYN			0000
2.C			A	0010
3.	COMMON /MONOF/ JJS,JJ		A	0020
4.	COMMON /RDOU4/ NTHETA,THETA(10),XTEST(10),N,ISWIRL,TSWIRL(400)		A	0030
5.	COMMON /DSEE3D/ RANG(400,10),REX(400,10),IPLOT(10),ICASE		A	0040
6.	COMMON /WIN/ XOFF(200),YOFF(200),NPHIN,NCLD,NCHI		A	0050
7.	COMMON /RDOU1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBMX,NTHA		A	0060
8.	1IN,NSPLY,YWING		A	0070
9.	COMMON /RDOU2/ T(400,2),VYAX(200,2),VYCR(200),V2(400),V3(400),VZCA		A	0080
10.	1R(200)		A	0090
11.	COMMON /RDOU3/ VXAX(200,2),VXCR(200)		A	0100
12.	COMMON /RCONT1/ VC,VINF,ALFAF,TTOTAL,ELND,VA,PT,CUTOFF		A	0110
13.	COMMON /CNTRYL/ YTESTH,YTESTS,N01,N02,N03,N04,N05			
14.	COMMON /COUT1/ OCA,PTC,PSPTCI,PI0180,ATOTAL,GRHO		A	0120
15.	COMMON /COUT2/ VINFP,RHOTOT,VIC		A	0130
16.	COMMON /GETOUT/ VMAG(3),ALIL,BLIL,CLIL		A	0140
17.	COMMON /TOUT1/ SINTH,COSTH,OMEGA		A	0150
18.	COMMON /RCONT2/ PSTAT,TSTAT,WDOT,NX,XND,YRIHUB,YRISHR,UTIP		A	0160
19.	COMMON /RSAVE/ XDUM(400),YDUM(400),XAFF(200),YAFF(200)		A	0170
20.	1 ,MO,JA,IR,NRUNO,M02,JA2,IR2,NRUNO2		A	0180
21.	COMMON/B00/DELO		A	0190
22.	ICASE=0		A	0200
23.	10 CALL READS		A	0210
24.	VSAVE=VINF		A	0220
25.	IF (VINF.EQ.0.0) GO TO 15		A	0230
26.	VINF=VINF*(1.0-.2*(VINF/ATOTAL)**2)**2.5		A	0240
27.	15 VCSAVE=VC		A	0250
28.	VC=VIC		A	0260
29.	CALL GETABC		A	0270
30.	VC=VCSAVE		A	0280
31.	VINFP=VINF		A	0290
32.	VINF=VSAVE		A	0300
33.	WRITE (6,35)VMAG(1),VMAG(2),ALIL,BLIL,CLIL,VINFP		A	0310
34.	CALL AVEV		A	0320
35.	REWIND 2		A	0330
36.	REWIND 3		A	0340
37.	DO 30 N=1,NTHETA		A	0350
38.	WRITE (6,40)N,NTHETA		A	0360
39.	READ (3) WDOT,VICT		A	0370
40.	IF (NX.NE.-1) GO TO 20		A	0380
41.	WRITE (4) VC,VINF,ALFAF,TTOTAL		A	0390
42.	WRITE (4) THETA(N)		A	0400
43.	20 WRITE (6,45)THETA(N),WDOT,VICT,VMAG(3)		A	0410
44.	1/ (NTHETA.EQ.0) WRITE (6,25)ISWIRL		A	0420
45.	25 FORMAT(91H0 3-D STREAMLINES WILL BE FOLLOWED BEGINNING AT THIS VALA		A	0430
46.	1UE OF THETA, NEAR THE FAN FACE, I= ,14)		A	0440
47.	THETA(N)=THETA(N)*PI0180		A	0450
48.	SINTH=SIN(THETA(N))		A	0460
49.	CSINTH=CLIL*SINTH		A	0470
50.	COSTH=COS(THETA(N))		A	0480
51.	CCOSTH=CLIL*COSTH		A	0490
52.	OMEGA=UTIP/YTESTS		A	0500
53.	CALL ONOFF		A	0510
54.	30 CONTINUE		A	0520
55.	IF (NX.EQ.-1) CALL INFRCE		A	0530
56.	GO TO 10		A	0540

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57.C*****		A	0550
58.C*** FORMATS		A	0560
59.C*****		A	0570
60.C		A	0580
61. 35 FORMAT (97H	V1	V2	A
62. 1 B C	VINFP	/5X,1P6E14,3I	A
63. 40 FORMAT (1H0,4X,12,4H OF ,12,7H THEYAS/1H0)			A
64. 45 FORMAT (3X,8HTheta = ,E12.5,13H	MDOTT = ,1PE12.5,12H	VICT	A
65. 1= ,1PE12.5,10H	V3 = ,1PE12.5)		A
66. END		A	0640

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50. ASINC		19 OCT 76	17
1.	FUNCTION ARSIN(X)	V	0000
2.	ARSIN=ASIN(X)	V	0010
3.	RETURN	V	0020
4.	END	V	0030

50. AVEEV		02 FEB 77	15
1.	SUBROUTINE AVEEV	G	0000
2.C		G	0010
3.C	APPROACH 5	G	0020
4.C		G	0030
5.	COMMON /MONOF/ JJ5,JJ	G	0040
6.	COMMON /RDOU1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBHX,NTMG	G	0050
7.	IN,NSPLY,YMING	G	0060
8.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCH1	G	0070
9.	COMMON /RDOU2/ T(400,2),VYAX(200,2),VYCR(200),V2(400),V3(400),VZCG	G	0080
10.	IR(200)	G	0090
11.	COMMON /RDOU3/ VXAX(200,2),VXCR(200)	G	0100
12.	COMMON /RDOU4/ NTHETA,THETA(10),XTEST(10),N,ISWIRL,TSWIRL(400)	G	0110
13.	COMMON /DSEE30/ RANG(400,10),REX(400,10),IPL0T(10),ICASE	G	0120
14.	COMMON /FORCE/ S(400),VOFFS(600), VRES(100),	G	0130
15.	IVX(100),YI(100),XI(100),NRI	G	0140
16.	COMMON /RCONT1/ VC,VINC,ALFAP,ITOTAL,ELND,VA,P1	G	0150
17.	COMMON /RCONT2/ PSTAT,TSTAT,WDOT,NX,KND,YRIHUB,YRISHR,UTIP	G	0160
18.	COMMON /COUT2/ VINFP,RHOTOT,VIC	G	0170
19.	COMMON /GETOUT/ VMAG(3),ALIL,RLIL,CLIL	G	0180
20.	COMMON /CNTRYL/ YTESTH,YTESTS,NOTHCT	G	0190
21.	DIMENSION IBEGIN(25), VBAR(400), A(400), VBAROF(200), RHG	G	0200
22.	IOBAR(400), RBROFF(200), RBORT(400), RBFORT(200)	G	0210
23.	DIMENSION ICD(25)	G	0220
24.	REWIND 2	G	0230
25.	REWIND 3	G	0240
26.	PI=3.14159265	G	0250
27.	PI0180=PI/180.	G	0260
28.	G=32.174	G	0270
29.	AC=PI*(YTESTS**2-YTESTH**2)/144.	G	0280
30.	ATOTAL=49.*SQRT(ITOTAL)	G	0290
31.	FACTR=(144./G)/RHOTOT	G	0300
32.	NSHR=NTMIN-NHUBMX+1	G	0310
33.	NBP1=NHUBMX+1	G	0320
34.	IF(NTHETA.EQ.0)ICASE=ICASE+1	G	0330
35.	IPL0T(ICASE)=0	G	0340
36.C****		G	0350
37.C***	FIND THE HIGH-LIGHT ON THE SHROUD	G	0360
38.C****		G	0370
39.	DO 10 I=NBP1,NTMIN	G	0380
40.	JJ=I	G	0390
41.	IF (XON(I).LE.XON(I+1)) GO TO 15	G	0400
42.	10 CONTINUE	G	0410
43.C****		G	0420
44.C***	MODIFICATION FOR SPLITTER TO FIND THE LAST POINT ON THE SHROUD	G	0430
45.C****		G	0440
46.	15 DO 20 I=JJ,NTMIN	G	0450
47.	JJS=I	G	0460
48.	IF (XON(I).GT.XON(I+1)) GO TO 25	G	0470
49.	20 CONTINUE	G	0480
50.C****		G	0490
51.C***	FIND AREAS FOR POINTS ON THE SHROUD THEN INTERPOLATE FOR ALL	G	0500
52.C***	OTHER POINTS	G	0510
53.C****		G	0520
54.	25 NHUBP1=NHUBMX+1	G	0530
55.	IF (NSPLY.EQ.0) GO TO 35	G	0540
56.	DO 30 IN=I,NSPLY	G	0550

57.	IED(IN)=NSPB(IN*1)-1	G	0560
58.	30 IF (IN.EQ.NSPLY) IED(IN)=NIMIN	G	0570
59.	C*****	G	0580
60.	C*** FIND AREA FOR EVERY POINT ON THE SHROUD	G	0590
61.	C*****	G	0600
62.	35 DO 55 I=NHUBP1,JJS	G	0610
63.	VS=YON(I)	G	0620
64.	XS=XON(I)	G	0630
65.	IF (I.GT.JJ) GO TO 50	G	0640
66.	ARS=C.0	G	0650
67.	IF (NSPLY.EQ.0) GO TO 45	G	0660
68.	C*****	G	0670
69.	C*** IF THERE ARE SPLITTERS, SUBTRACT AREA OF SPLITTERS FROM OVERALL ARG	G	0680
70.	C*****	G	0690
71.	DO 40 IN=1,NSPLY	G	0700
72.	NSB=NSPB(IN)	G	0710
73.	NSE=NSPE(IN)	G	0720
74.	IF (XS.LT.XON(NSE).OR.XS.GT.XON(NSB)) GO TO 40	G	0730
75.	CALL SINTP (XON(NSB),YON(NSB),NSE-NSB*,XS,YSP1)	G	0740
76.	CALL SINTP (XON(NSE),YON(NSE),IED(IN)-NSE,XS,YSP2)	G	0750
77.	ARS=PI*(YSP2**2-YSP1**2)*ARS	G	0760
78.	40 CONTINUE	G	0770
79.	45 CALL SINTP (XON,YON,NHUBMX,XS,YH)	G	0780
80.	A(I)=PI*(YS**2-YH**2)-ARS	G	0790
81.	GO TO 55	G	0800
82.	50 R=SQRT(YS**2+(XS-XON(JJ))**2)	G	0810
83.	RADZAK=YON(JJS)-YON(JJ)		
84.	IF (RADZAK.EQ.0.) RADZAK=.0001		
85.	A(I)=(1.0+(YS-YON(JJ))/RADZAK)*PI*R*(R+XS-XON(JJ))	O	0820
86.	IF (A(I).LE.A(I-1)) A(I)=A(I-1)*1.05		
87.	55 CONTINUE	G	0830
88.	C*****	G	0840
89.	C*** INTERPOLATE AREAS FROM THE POINTS ON THE SHROUD TO OBTAIN	G	0850
90.	C*** REMAINING AREAS	G	0860
91.	C*****	G	0870
92.	NCNTH=0	G	0880
93.	DO 65 I=1,NTHIN	G	0890
94.	IF (I.GE.NHUBP1.AND.I.LE.JJS) GO TO 65	G	0900
95.	IF (XON(I).LT.XON(JJ)) GO TO 60	G	0910
96.	XA=XON(I)	G	0920
97.	CALL SINTP (XON(NHUBP1),A(NHUBP1),JJ-NHUBMX,XA,AX)	G	0930
98.	A(I)=AX	G	0940
99.	GO TO 65	G	0950
100.	60 NCNTH=NCNTH+1	G	0960
101.	65 CONTINUE	G	0970
102.	70 DO 140 N=1,NTHETA	G	0980
103.	IF (ISWIRL.NE.0)	G	0990
104.	1TSWIRL(ISWIRL)=THETA(I)	G	1000
105.	IF (NTHETA.EQ.0) CALL SRINE(XON,YON,XRI,YRIHUB,YRISHR,NHUBMX,NTHIN,SG	G	1010
106.	1)	G	1020
107.	THETA(N)=THETA(N)*PI*180	G	1030
108.	COSTH=COS(THETA(N))	G	1040
109.	CCOSTH=CLIL*COSTH	G	1050
110.	SINTH=SIN(THETA(N))	G	1060
111.	CSINTH=CLIL*SINTH	G	1070
112.	VICT=VIC+CLIL*VHAG(3)*COSTH*(1-NOTHEI)	G	1080
113.	WOOTI=G*RHOTOT*VICT*AC	G	1090

114.	FACTOR=FACTOR*WDOVT	G	1100
115.	IF (NCNTH.EQ.0) GO TO 80	G	1110
116.	VINF=VINFP	G	1120
117.	IF (VINFP.EQ.0.) VINFA=1.E-6	G	1130
118.	AINFP=FACTOR/VINF	G	1140
119.	DO 75 I=1,NCNTH	G	1150
120.	ATII= AINFP*(A(I,J)-AINFP)*(XON(I)-XON(I))/(XON(J)-XON(I))	G	1160
121.	75 CONTINUE	G	1170
122.	80 WRITE (3) WDOVT,VICT	G	1180
123.C****		G	1190
124.C***	CALCULATE VBAR FOR EVERY POINT ON BODY	G	1200
125.C****		G	1210
126.	ISTOP=NYMIN	G	1220
127.	SLOPE = (XON(IJS)-XON(IJJ))/(YON(IJS)-YON(IJJ))	G	1230
128.C((((((((((((VBAR CALCULATION MODIFIED 12/20/73	((	G	1240
129.C((((((((((((AND REVISED - 3/30/75	((	G	1250
130.C((((((((IF A POINT IS PAST STAGNATION (VP.GT.0) AND IS ON THE SHROUD, ANG		G	1260
131.C((((((((FREESTREAM VEL. IS GT VICT, THEN, VBAR= FREESTREAM. IF THIS TEST		G	1270
132.C((((((((FAILS, VBAR CAN STILL BE SET TO FREESTREAM, PROVIDED -		G	1280
133.C((((((((VBAR.LT.FREESTREAM.LT.VICT		G	1290
134.C		G	1300
135.C	ONBODY RHOBAR AND VRES CALCULATIONS	G	1310
136.C		G	1320
137.	RRSRTF=RHOTOT*(1.0-.2*(VINF/ATOTAL)**2)**2.5	G	1330
138.	RSORTC=1.0-.2*(VVC/ATOTAL)**2)**2.5	G	1340
139.	DO 100 I=1,NTHIN	G	1350
140.	VP=ALIL*V(I,1)*BLIL*V(I,2)*CCOSTH*V2(I)	G	1360
141.	VTH=CSINTH*V3(I)	G	1370
142.	IF (NTHETA.NE.0.OR.I.LE.ISWIRL) GO TO 85	G	1380
143.	VEETH=V3(I-1)*CLIL*SINTH*SWIRL(I-1)*3.14159265/180.)	G	1390
144.	VEEP= ALIL*V(I,1)*BLIL*V(I,2)*CLIL*V2(I-1)*COS(ITSWIRL(I-1)*G	G	1400
145.	13.14159265/180.)	G	1410
146.	SOLD=SQR((YON(I)-YON(I-1))**2+(XON(I)-XON(I-1))**2)	G	1420
147.	TSWIRL(I)=TSWIRL(I-1)-SOLD/YON(I)*VEETH/VEEP/PI0180	G	1430
148.	S(I)=S(I-1)-SOLD/ABS(VEEP)*SQR((VEEP**2+VEETH**2)	G	1440
149.	V0=VP-V2(I)*CLIL*(COSTH-COS(ITSWIRL(I)*3.14159265/180.))	G	1450
150.	IF (VQ.LT.1.3*VEEP.AND.VQ.LT.0.) VQ=-VEEP	G	1460
151.	IF (VEEP *VQ .LE.0.) S(I)=SOLD*S(I-1)	G	1470
152.	IF (VEEP *VQ .LT.0.) TSWIRL(I)=TSWIRL(I-1)	G	1480
153.	VP=VP-V2(I)*CLIL*(COSTH-COS(ITSWIRL(I)*3.14159265/180.))	G	1490
154.	VTH=VTH*SINTH*SWIRL(I)*3.14159265/180.1/SINTH	G	1500
155.	IF (XON(I).GT.XON(ISWIRL)) GO TO 85	G	1510
156.	IPLOT(ICASE)=IPLOT(ICASE)+1	G	1520
157.	ICOUNT=IPLOT(ICASE)	G	1530
158.	RANG(ICOUNT,ICASE)=TSWIRL(I)	G	1540
159.	REX(ICOUNT,ICASE)=XON(I)	G	1550
160.	IF (I.GT.JJ) REX(ICOUNT,ICASE)=-REX(ICOUNT,ICASE)	G	1560
161.C		G	1570
162.C	ORIGINAL VRES0N	G	1580
163.C		G	1590
164.	85 VRES0N=SQR(VP**2+VTH**2)	G	1600
165.	RESVV=VRES0N	G	1610
166.C((((((((NEW TEST -		G	1620
167.	IF (VP.GT.0..AND.VINFP.NE.0..AND.I.GT.NHUBHX.AND.I.LE.JJS.AND.VINFG	G	1630
168.	1P.GE.VICT) GO TO 90	G	1640
169.C		G	1650
170.C	APPROACH 5 VRES0N	G	1660

171.C		G	1670
172.	VBAR(I)=FACTOR/A(I)	G	1680
173.	IF (VBAR(I).LT.VINFP.AND.VINFP.LT.VICT.AND.VINFP.NE.0..AND.I.GT.NHG	G	1690
174.	1UBMX) GO TO 90	G	1700
175.	CALL VBARIT (VBAR(I),ATOTAL,RHOTOT,RHOBAR(I))	G	1710
176.	GO TO 95	G	1720
177.	90 VBAR(I)=VINFP	G	1730
178.	RHOBAR(I)=RRSRIF	G	1740
179.	95 RBORT(I)=RHOBAR(I)/RHOTOT	G	1750
180.	VRESON=VRESON*(1.0/RBORT(I))*((VRESON/VBAR(I))	G	1760
181.	VP=VRESON*VP/RESVV	G	1770
182.	VTH=VRESON*VTH/RESVV	G	1780
183.	WRITE (3) VRESON,VP,VTH	G	1790
184.	100 CONTINUE	G	1800
185.	WRITE (2) (VBAR(I),RBORT(I),I=1,NYMIN)	G	1810
186.C		G	1820
187.C	OFF BODY POINTS A AND VBAR	G	1830
188.C		G	1840
189.	J=1	G	1850
190.	IBEGIN(I)=1	G	1860
191.	NRAKES=1	G	1870
192.	DO 110 I=1,NPMIN	G	1880
193.	IF (ABS(XOFF(I+1)-XOFF(I)).GT..01) GO TO 105	G	1890
194.	GO TO 110	G	1900
195.	105 IF (I.EQ.NPMIN) GO TO 110	G	1910
196.	J=J+1	G	1920
197.	IBEGIN(J)=I+1	G	1930
198.	NRAKES=J	G	1940
199.	110 CONTINUE	G	1950
200.	DO 130 I=1,NRAKES	G	1960
201.	IB=IBEGIN(I)	G	1970
202.C****		G	1980
203.C*** FIND AREA FOR OFF-BODY RAKES		G	1990
204.C****		G	2000
205.	IF (XOFF(IB).LE.XON(JJ)) GO TO 115	G	2010
206.	CALL SINTP (XON(NHUBP1),A(NHUBP1),JJ-NHUBMX,XOFF(IB),AR)	G	2020
207.	GO TO 120	G	2030
208.	115 AR=A(JJ)	G	2040
209.	120 VB=FACTOR/AR	G	2050
210.	CALL VBARIT (VB,ATOTAL,RHOTOT,RHB)	G	2060
211.	IE=IBEGIN(I+1)-1	G	2070
212.	IF (I.EQ.NRAKES) IE=NPMIN	G	2080
213.	DO 125 J=IB,IE	G	2090
214.	VBAROF(J)=VB	G	2100
215.	RBROFF(J)=RHB	G	2110
216.	125 CONTINUE	G	2120
217.	130 CONTINUE	G	2130
218.	DO 135 I=1,NPMIN	G	2140
219.C		G	2150
220.C	ORIGINAL VRESOF	G	2160
221.C		G	2170
222.	VXC=ALIL*VXAX(I,1)+BLIL*VXAX(I,2)+CCOSTH*VXCR(I)	G	2180
223.	VYC=ALIL*VYAX(I,1)+BLIL*VYAX(I,2)+CCOSTH*VYCR(I)	G	2190
224.	VZC=CSINTH*VZCRI(I)	G	2200
225.	VRESOF=SQRT(VXC**2+VYC**2+VZC**2)	G	2210
226.	RESVV=VRESOF	G	2220
227.C		G	2230

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228.C	APPROACH 5 VRESOF	G	2240
229.	RBFOR1(I)=RBROFF(I)/RHO10T	G	2250
230.	VRESOF=VRESOF*(1.0/RBFOR1(I))*+(VRESOF/VBAROF(I))	G	2260
231.	VXC=VRESOF*VXC/RESVV	G	2270
232.	VYC=VRESOF*VYC/RESVV	G	2280
233.	VZC=VRESOF*VZC/RESVV	G	2290
234.	WRITE (3) VRESOF,VXC,VYC,VZC	G	2300
235.	135 CONTINUE	G	2310
236.	WRITE (2)(VBAROF(I),RBFOR1(I),I=1,NPMIN)	G	2320
237.	THETA(N)=THETA(N)/PI*180	G	2330
238.	140 CONTINUE	G	2340
239.	RETURN	G	2350
240.	END	G	2360

SO.BEFORCE

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1.	SUBROUTINE BEFORC(PSOPTC,PSOPT)	K	0000
2.	COMMON/ROW/RHOST	K	0010
3.	COMMON /RCONT1/ VC,VINF,ALFAF,TTOTAL,FLND,VA,PT	K	0020
4.	COMMON /RCONT2/ PSTAT,TSTAT,WDOT,NX,KND,YRIHUB,YRISHR,UTIP	K	0030
5.	COMMON /RDOU1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBHX,NYMK	K	0040
6.	1IN,NSPLT,YWING	K	0050
7.	COMMON /COUT1/ QCA,PTC,PSPTCI,PI0180,ATOTAL,GRHO	K	0060
8.	COMMON /ONOUT/ VRESO(400),VP(400),BETAON(400)	K	0070
9.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCHI	K	0080
10.	COMMON /VOUT1/ PSOPC(100),PHI(100),ZETA(100),VYI(100),CPC(100),VK	K	0090
11.	1Z(100),VMI(100),VAFTI(100),VSPANI(100),ETAI(100)	K	0100
12.	COMMON /RDOU4/ NTHETA,THETA(10),XTEST(10)	K	0110
13.	COMMON /FORCE/ S(400),VAFT(200),VXC(200),VRESOF(200),VRES(100),	K	0120
14.	1VX(100),Y(100),X(100),NRI	K	0130
15.	DIMENSION PSOPTC(1),PSOPT(1)	K	0140
16.	DIMENSION PSOP(400)	K	0150
17.	EQUIVALENCE (PSOP(1),PSOPC(1))	K	0160
18.	IKEEP=0	K	0170
19.	DO 10 I1=1,NHUBHX	K	0180
20.	IF (XON(I1).GT.XTEST(1)) GO TO 10	K	0190
21.	IKEEP=I1+1	K	0200
22.	10 CONTINUE	K	0210
23.	WRITE(4) IKEEP	K	0220
24.	WRITE(4) (XON(I2),YON(I2),PSOPTC(I2),	K	0230
25.	1PSOPT(I2),	K	0240
26.	2 S(I2),VRESO(I2),I2=1,IKEEP)	K	0250
27.	IKP=0	K	0260
28.	NHUBP1=NHUBHX+1	K	0270
29.	DO 25 I3=NHUBP1,NMIN	K	0280
30.	IF (IKP.EQ.1) GO TO 25	K	0290
31.	IF (YON(I3).GT.YWING) GO TO 20	K	0300
32.	IF (XON(I3).GT.XTEST(1).AND.XON(I3+1).LE.XTEST(1)) GO TO 15	K	0310
33.	GO TO 25	K	0320
34.	15 IBGS=I3	K	0330
35.	GO TO 25	K	0340
36.	20 INDS=I3	K	0350
37.	IKP=1	K	0360
38.	25 CONTINUE	K	0370
39.	KLIH=INDS-IBGS+1	K	0380
40.	WRITE(4) KLIH	K	0390
41.	WRITE(4) (XON(I4),YON(I4),PSOPTC(I4),	K	0400
42.	1PSOPT(I4),	K	0410
43.	2 S(I4),VRESO(I4),I4=IBGS,INDSK	K	0420
44.	1)	K	0430
45.	RETURN	K	0440
46.	ENTRY OFFORC(PSOPTC,PSOPT)	K	0450
47.	KKT=NCHI-NCL0+3	K	0460
48.	WRITE(4) KKT	K	0470
49.	WRITE(4) X(NRI),Y(NRI),VX(NRI),VRES(NRI),PSOPC(NRI),PSOP(NRI),	K	0480
50.	1VAFTI(NRI)	K	0490
51.	WRITE(4) (XOFF(I5),YOFF(I5),VXC(I5),VRESOF(I5),PSOPTC(I5),PSOPT(I5K	K	0500
52.	2)	K	0510
53.	1,VAFT(I5),I5=NCL0,NCHI)	K	0520
54.	NRI=NRI+1	K	0530
55.	WRITE(4) X(NRI),Y(NRI),VX(NRI),VRES(NRI),PSOPC(NRI),PSOP(NRI),	K	0540
56.	1VAFTI(NRI)	K	0550

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57. RETURN
58. END

K 0560
K 0570

Line	Code	Statement	Address
1		SUBROUTINE CONST	C 0000
2	C		C 0010
3	C	THIS SUBROUTINE CALCULATES MOST OF THE CONSTANTS USED IN COMBYN	C 0020
4	C		C 0030
5		COMMON/ROW/RHOST	C 0040
6		COMMON /RCONT1/ VC,VINF,ALFAF,TTOTAL,ELND,VA,PT,CUTOFF	C 0050
7		COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCHI	C 0060
8		COMMON/FLAGS/IVORT,IJEOM,ISIG,ICURV,NONEWF,IDENT	C 0070
9		COMMON /RCONT2/ PSTAT,TSTAT,WDOT,NX,KND,YRIHUB,YRISHR,UTIP	C 0080
10		COMMON/ROP/WDDTCR	C 0090
11		COMMON /COUT1/ QCA,PTC,PSPICI,PIO180,ATOTAL,GRFO	C 0100
12		COMMON /COUT2/ VINFP,RHOTOT,VIC	C 0110
13		COMMON /WRT/ KSKIP,NT(2),NP(2)	C 0120
14		COMMON /RDOU4/ NTHETA,THETA(10),XTEST(10),N,ISWIRL,TSWIRL(400)	C 0130
15		COMMON /RDOU11/ XON(400),YON(400),NSPE(10),NSPE(10),XRI,NHUBMX,NTMC	C 0140
16		IIN,NSPLT,YWING	C 0150
17		COMMON/CNTRYL/ YTESTH,YTESTS,NOTHET,ICTLPT,VCP,VCPBAR,RHOCCP	C 0160
18		REAL MC,MA,MINF	C 0170
19		PI=3.14159265	C 0180
20		R21568=1715.63	C 0190
21		G=32.174	C 0200
22		REWIND 4	C 0210
23		PSTATC=PSTAT	C 0220
24		PIO180=PI/180.	C 0230
25		IF (PSTAT.NE.0.0.AND.TSTAT.NE.0.0) GO TO 10	C 0240
26		IF (PT.EQ.0.0) PT=2116.22	C 0250
27		IF (TTOTAL.EQ.0.0) TTOTAL=518.67	C 0260
28		ATOTAL=49.*SQRT(TTOTAL)	C 0270
29		CATOT=1.0-.2*(VINF/ATOTAL)**2	C 0280
30		PSTATC=PT*CATOT**3.5	C 0290
31		PTC=PT	C 0300
32		RHOTOT=PT/(R21568*TTOTAL)	C 0310
33		TSTAT=TTOTAL*CATOT	C 0320
34		RHOST=PSTATC/(R21568*TSTAT)	C 0330
35		PSTAT=PT-.5*RHOTOT*VINF*VINF	C 0340
36		ASTAT=49.*SQRT(TSTAT)	C 0350
37		GO TO 15	C 0360
38	10	ASTAT=49.0*SQRT(TSTAT)	C 0370
39		RHOST=PSTAT/(R21568*TSTAT)	C 0380
40		AMINF=VINF/ASTAT	C 0390
41		CAMINF=1.0+.2*AMINF**2	C 0400
42		PTC=PSTAT*CAMINF**3.5	C 0410
43		PSTAT=PT-.5*RHOTOT*VINF*VINF	C 0420
44		PT=PTC	C 0430
45		TTOTAL=TSTAT*CAMINF	C 0440
46		RHOTOT=PT/(R21568*TTOTAL)	C 0450
47		ATOTAL=49.*SQRT(TTOTAL)	C 0460
48	15	AC=PI*(YTESTS**2-YTESTH**2)/144.	C 0470
49		VSONIC=ATOTAL/1.728	
50		VSONCC=ATOTAL/SQRT(1.2)	
51		IF (WDOT.EQ.0.0) GO TO 25	C 0510
52		VIC=WDOT/(G*RHOTOT*AC)	C 0520
53		VICC=ATOTAL/1.728	C 0530
54		C*****	C 0540
55		FOR D. BREUNLIN TAKE OUT FOLLOWING THREE(3) CARDS 8/30/71	C 0550
56		C*****	C 0560

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57 C IF (VIC.LE.VICC) GO TO 25 C 0570
58 C VIC = VICC C 0580
59 C WDOT = RHOTOT*VICC*AC*G C 0590
60 CALL VBARIT (VIC,ATOTAL,RHOTOT,RHOC) C 0600
61 C - - IF WDOT CANNOT BE RECONSTRUCTED USING VIC, THEN VBARIT HAS LOWER C 0610
62 C - - VIC, AND VC=VSONIC, AND WDOT MUST BE LOWERED TO CHOKING FLOW C 0620
63 IF (VIC*G*RHOTOT*AC.LT..999*WDOT) WRITE (6,115)WDOT C
64 IF (VIC*G*RHOTOT*AC.LT..999*WDOT)WDOT=VIC*G*RHOTOT*AC C
65 C - - IF A CONTROL PT INDEX WAS INPUT, USE PRESS RATIO (STORED IN VC) C 0650
66 C - - A VBAR AND RHOBAR THERE FOR A,B,C CALCULATIONS. C 0660
67 IF (ICTLPT.EQ.0) GO TO 20 C 0670
68 VCP=ATOTAL*SQR(5.*(1.-VC**2)) C 0680
69 POPTCP=VC C 0690
70 YCPH=0. C 0700
71 IF (XON(ICTLPT).GE.XON(1))CALL SINTP(XON,YON,NHUPMX,XON(ICTLPT),YCP C 0710
72 IH) C 0720
73 VCPBAR=WDOT/(G*RHOTOT*PI/144.*(YON(ICTLPT)**2-YCPH**2)) C 0730
74 CALL VBARIT(VCPBAR,ATOTAL,RHOTOT,RHOC) C 0740
75 20 VC=WDOT/(G*PHOC*AC) C 0750
76 25 IF (VC.GT.VSONCC)WRITE (6,116) VC
77 IF (VC.GT.VSONCC)VC=VSONCC
78 IF (VA.EQ.0.0) VA=VC C 0760
79 C***** C 0770
80 C*** TESTS FOR NORMALIZING PARAMETERS (ELND) C 0780
81 C*** IF KND = -1, ELND = YRISHR C 0790
82 C*** 0, SET ELND = 1.0 AND SKIP NONDIMENSIONAL CALCULATION C 0800
83 C*** 1, ELND = YRISHR - YRIHUB C 0810
84 C*** 2, USE READ IN VALUE OF ELND C 0820
85 C*** 4,5,6 USE VA FOR NONDIMENSIONALIZING VELOCITIES C 0830
86 C***** C 0840
87 IF (KND.GE.0) GO TO 35 C 0850
88 30 IF (KND.EQ.-1.OR.KND.EQ.4) ELND=YTESTS C 0860
89 IF (KND.EQ.1.OR.KND.EQ.6) ELND=YTESTS-YTESTH C 0870
90 IF (KND.EQ.0.OR.KND.EQ.5) ELND=1.0 C 0880
91 XRI=XRI/ELND C 0890
92 YRIHUB=YRIHUB/ELND C 0900
93 YRISHR=YRISHR/ELND C 0910
94 YTESTS=YTESTS/ELND C 0920
95 YTESTH=YTESTH/ELND C 0930
96 YWING=YWING/ELND C 0940
97 WDOT=WDOT/ELND/ELND C 0950
98 AC=AC/ELND/ELND
99 35 RTTOT=R2156R*TTOTAL C 0960
100 GRHO=32.174*PT/RTTOT C 0970
101 C102RT=.5/RTTOT C 0980
102 IF (PSTAT.NE.0.0) C102RT=.5*RHOST/PT C 0990
103 VCOVA=VC/VA C 1000
104 VIOVA=VINF/VA C 1010
105 VNOVC=VINF/VC C 1020
106 VFOAT=VINF/ATOTAL C 1030
107 VCOAT=VC/ATOTAL C 1040
108 VAOAT=VA/ATOTAL C 1050
109 CON1=1.0-.2*VCOAT**2 C 1060
110 CON2=1.0-.2*VFOAT**2 C 1070
111 CON3=1.0-.2*VAOAT**2 C 1080
112 RSORTF=CON2**2.5 C 1090
113 RSORTA=CON3**2.5 C 1100

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114		RSORTC=CON1**2.5	C	1110
115		IF (WDOT.EQ.0.0) VIC = VC*RSORTC	C	1120
116		IF (WDOT.EQ.0.0) WDOT=VIC*G*RHOTOT*AC	C	1130
117		PSPTC=1.0-C102RT*VC**2	C	1160
118		PSPTIF=1.0-C102RT*VINP**2	C	1170
119		PSPTCI=RSORTF*CON2	C	1180
120		PSPTCC=RSORTC*CON1	C	1190
121		PSPTCA=RSORTA*CON3	C	1200
122		PSPTA=1.0-C102RT*VA**2	C	1210
123		MINF=VFOAT/(CON2**5)	C	1220
124		MC=VCOAT/(CON1**5)	C	1230
125		MA=VAOAT/(CON3**5)	C	1240
126		QINF=PT*(1.0-PSPTIF)	C	1250
127		QCINF=PTC*(.7*VFOAT**2*RSORTF)	C	1260
128		QC=PT*(1.0-PSPTC)	C	1270
129		QCC=PTC*(.7*VCOAT**2*RSORTC)	C	1280
130		QA=PT*(1.0-PSPTA)	C	1290
131		QCA=PTC*(.7*VAOAT**2*RSORTA)	C	1300
132		THETC=TTOTAL/518.67	C	1310
133		DEL=PTC/2116.22	C	1320
134		HBTPR=YTESTH/YTESTS	C	1330
135		WDOTCR=WDOT*SQRT(THETC)/DEL	C	1340
136		WRITE (4) NCLO, NCHI, NTMIN, NPMIN, RHOST, (XTEST(10), IU=1, 10)	C	0480
137		WRITE (4) YTESTH, YTESTS, YWING	C	0490
138		WRITE (4) NTHETA	C	0500
139		WRITE (6, 50)	C	1350
140		WRITE (6, 55) VC, MC, QC, QCC, PSPTC, PSPTCC, RSORTC	C	1360
141		WRITE (6, 60) VA, MA, QA, QCA, PSPTA, PSPTCA, RSORTA	C	1370
142		WRITE (6, 65) VINP, MINP, QINF, QCINF, PSPTIF, PSPTCI, RSORTF	C	1380
143		WRITE (6, 70)	C	1390
144		WRITE (6, 75) ALFAF, VNF0VC, V10VA, VCOVA, VSONIC, VSONCC, WDOTCR	C	1400
145		WRITE (6, 80)	C	1410
146		WRITE (6, 85) TSTAT, PSTAT, PSTATC, ASTAT, RHOST, WDOT, VIC	C	1420
147		WRITE (6, 90)	C	1430
148		WRITE (6, 95) TTOTAL, PT, PTC, ATOTAL, RHOTOT, THETC, DEL	C	1440
149		WRITE (6, 80)	C	1450
150		IF (ICILPT.EQ.0) GO TO 40	C	1460
151		WRITE (6, 120) ICILPT, POITCP, VCP, VCPBAR, RHOCPP	C	1470
152		GO TO 45	C	1480
153	40	WRITE (6, 70)	C	1490
154	45	WRITE (6, 100) XRI, YRIHUB, YRISHR, HBTPR, ELND, CUTOFF	C	1500
155		WRITE (6, 70)	C	1510
156		WRITE (6, 105) XTEST(1), YTESTH, YTESTS, YWING	C	1520
157		WRITE (6, 80)	C	1530
158		WRITE (6, 110) NT(1), NP(1), NCLO, NCHI, NHUBMX, NX, KND, KSKIP, NOTHET, ISWIC	C	1540
159		ZRL, NT(2), NP(2)	C	1550
160	C		C	1560
161	C	FORMATS	C	1570
162	C		C	1580
163		RETURN	C	1590
164	C		C	1600
165	50	FORMAT (11H, 27X, 58HMACH DYNAMIC PRESSURE	PREC	1610
166		ISSURE RATIO/107H VELOCITY NO INC.	C	1620
167	2	COMP. INC. COMP. DENSITY RATIO)	C	1630
168	55	FORMAT (11H CONTROL ,1PE10.3,1P6E14.3)	C	1640
169	60	FORMAT (11H BULK ,1PE10.3,1P6E14.3)	C	1650
170	65	FORMAT (11H FREE ,1PE10.3,1P6E14.3/8H STREAM)	C	1660

171	70	FORMAT (1H0)							C	1670
172	75	FORMAT (87H	ALFAF	VINF/VC	VINF/VA			VCC		1680
173		1/VA	VSONIC	VSONIC,14H	WDOTCR /				C	1690
174				5X,1P7E14.3)					C	1700
175	80	FORMAT (1H0,110H							C	1710
176		1						/)	C	1720
177	85	FORMAT (100H	TSTAT	PSTAT	PSTATC				C	1730
178		1 ASTAT	RHOSTAT	WDOT	VIC /9X,1PE10.3,1P6E14.3				C	1740
179		2)							C	1750
180	90	FORMAT (101H	T10T	PTOT	PTOTC				C	1760
181		1 ATOY	RHOTOT	THET	DEL/5X,1P7E14.3)				C	1770
182	95	FORMAT (1H0,6E12.5)							C	1780
183	100	FORMAT (94H	XRI	YRIHUB	YRISHR	HUB-TC			C	1790
184		1IP RATIO	LND	P-S PLOT CUTOFF/5X,1P6E14.3)					C	1800
185	105	FORMAT (62H	XTEST	YTESTH	YTESTS				C	1810
186		1 YWING/5X,1P4E14.3)							C	1820
187	110	FORMAT (94H	NT	NP	NCLO	NCHI	NHUBMX		C	1830
188		1 NX KND	KSKIP	NOTHET	ISWIRL /				C	1840
189		2		10X,1H1,14,5X,1H1,15,4X,13,5X,13,6X,13,6X,12,4					C	1850
190		3X,12,6X,12,8X,12,8X,12/							C	1860
191				10X,1H2,14,5X,1H2,15)					C	1870
192	115	FORMAT(22H - - - - WEIGHT FLOW= ,E15.6, * EXCEEDS CHOKED FLOW.*						/ C		1880
193		1 * PROCEEDING WITH CHOKING VALUE LISTED BELOW*)								
194	116	FORMAT(20CONTROL STATION VELOCITY= ,E13.4, * EXCEEDS VSONIC*/								
195		1* PROCEEDING WITH VC=VSONIC. IF YOUR CONTROL STATION *								
196		2/* IS NOT AT THE THROAT, RESUBMIT WITH A LOWER VC*)								
197	120	FORMAT(75H CONTROL PT INDEX	PRESS. RATIO	VCP.				VBC		1900
198		1AR	RHOCCP /1X,11H(FOR A,B,C) ,1X,14,1P4E14.3/)						C	1910
199		END							C	1920

DBRKPT PRINTS

50.GTABC		19 OCT 76	12
1.	SUBROUTINE GETABC	E	0000
2.C****		E	0010
3.C***	COMPUTES V1 , V2 , V3 , A , B , C FROM INPUT PARAMETERS	E	0020
4.	COMMON /RDOU1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBMX,NTHC	E	0030
5.	IIN,NSPLT,YMING	E	0040
6.	COMMON/CNTRYL/ YTESTH,YTESTS,NOTHET,ICTLPT,VCP,VCPBAR,RHOCCP	E	0050
7.	COMMON /COUT2/ VINFP,RHOTOT,VIC	E	0060
8.	COMMON /RDOU2/ T(400,2),VYAX(200,2),VYCR(200),VZ(400),VZCE	E	0070
9.	IR(200)	E	0080
10.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCHI	E	0090
11.	COMMON/FLAGS/IVORT,IGEOM,ISIG,ICURV,NONEWF,IDENT	E	0100
12.	COMMON /RDOU3/ VXAX(200,2),VXCR(200)	E	0110
13.	COMMON /RCONT1/ VC,VINF,ALFAF,TTOTAL,ELND,VA,PI	E	0120
14.	COMMON /GETOUT/ VMAG(3),ALIL,BLTL,CLIL	E	0130
15.	COMMON /GEABC/ YI	E	0140
16.	DIMENSION VXAXH(2), VXAXS(2)	E	0150
17.	NAMLIST/CCC/ VMAG,ARE,ESS,ALFAF	E	0160
18.	NAMLIST/RBB/ VMAG,V2	E	0170
19.	PI0180=3.14159265/180.	E	0180
20.	ALFAF=ALFAF*PI0180	E	0190
21.C****		E	0200
22.C***	COMPUTE V1 , V2 , V3	E	0210
23.C****		E	0220
24.	IF (ICTLPT.NE.D.AND.ALFAF.NE.999.*PI0180) GO TO 55	E	0230
25.	IF (XOFF(NCL0).LT.XON(1)) GO TO 20	E	0240
26.C		E	0250
27.C	SEARCH ON HUB COUNTING BACKWARDS	E	0260
28.C		E	0270
29.	J=NHUBMX	E	0280
30.	10 IF (XON(J).LT.XOFF(NCL0)) GO TO 15	E	0290
31.	J=J-1	E	0300
32.	GO TO 10	E	0310
33.	15 J=J+1	E	0320
34.	XH=XOFF(NCL0)	E	0330
35.	IFLAG=1	E	0340
36.	CALL INTPOL (1,J,XH,IFLAG,VX,DUM,DUM,DUM)	E	0350
37.	VXAXH(1)=VX	E	0360
38.	CALL INTPOL (2,J,XH,IFLAG,VX,DUM,DUM,DUM)	E	0370
39.	VXAXH(2)=VX	E	0380
40.	CALL INTPOL (3,J,XH,IFLAG,VXCRH,DUM,DUM,DUM)	E	0390
41.	YH=YI	E	0400
42.	GO TO 25	E	0410
43.	20 YH=0.0	E	0420
44.	VXAXH(1)=0.0	E	0430
45.	VXAXH(2)=0.0	E	0440
46.	VXCRH=0.0	E	0450
47.C****		E	0460
48.C***	SEARCH ON SHROUD COUNTING FORWARDS	E	0470
49.C****		E	0480
50.	25 K=NHUBMX+1	E	0490
51.	30 IF (XON(K).LT.XOFF(NCHI)) GO TO 35	E	0500
52.	K=K+1	E	0510
53.	GO TO 30	E	0520
54.	35 K=K-1	E	0530
55.	XS=XOFF(NCHI)	E	0540
56.	IFLAG=1	E	0550

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57. CALL INTPOL (1,R,XS,IFLAG,VX,DUM,DUM,DUM) E 0560
58. VXAXS(1)=VX E 0570
59. CALL INTPOL (2,M,XS,IFLAG,VX,DUM,DUM,DUM) E 0580
60. VXAXS(2)=VX E 0590
61. CALL INTPOL (3,M,XS,IFLAG,VXCRS,DUM,DUM,DUM) E 0600
62. YS=YI E 0610
63. ILOW=NCLO+1 E 0620
64. IHIGH=NCHI-1 E 0630
65.C E 0640
66.C AXIAL COMPONENT VELOCITY *** AXISYMETRIC SOLUTION E 0650
67.C E 0660
68. DO 45 L=1,2 E 0670
69. SUM=YH*VXAXH(L)*(YOFF(NCLO)-YH)+VXAX(NCLO,L)*YOFF(NCLO)*(YOFF(NCLOE 0680
70. 1+1)-YH) E 0690
71. DO 40 I=ILOW,IHIGH E 0700
72. SUM=SUM+VXAX(I,L)*YOFF(I)*(YOFF(I+1)-YOFF(I-1)) E 0710
73. 40 CONTINUE E 0720
74. SUM=SUM+YOFF(NCHI)*VXAX(NCHI,L)*(YS-YOFF(NCHI-1))+(-1.0)*YS*VXAXS(E 0730
75. 1L)*(YS-YOFF(NCHI)) E 0740
76. VMAG(L)=SUM/(YS**2-YH**2) E 0750
77. 45 CONTINUE E 0760
78.C E 0770
79.C AXIAL COMPONENT CROSSFLOW VELOCITY SOLUTION E 0780
80.C E 0790
81. SUM=YH*VXCRH*(YOFF(NCLO)-YH)+VXCR(NCLO)*YOFF(NCLO)*(YOFF(NCLO+1)-YE 0800
82. 1H) E 0810
83. DO 50 I=ILOW,IHIGH E 0820
84. SUM=SUM+VXCR(I)*YOFF(I)*(YOFF(I+1)-YOFF(I-1)) E 0830
85. 50 CONTINUE E 0840
86. SUM=SUM+YOFF(NCHI)*VXCR(NCHI)*(YS-YOFF(NCHI-1))+(-1.0)*YS*VXCRS*(YE 0850
87. 1S-YOFF(NCHI)) E 0860
88. VMAG(3)=SUM/(YS**2-YH**2) E 0870
89. 55 CLIL=VINF*COB(ALFAF) E 0880
90. IF (IVORT.EQ.1) GO TO 60 E 0890
91. ALIL=(VC+VINF*SIN(ALFAF)*VMAG(2))/(VMAG(1)-VMAG(2)) E 0900
92. BLIL=(VC+VINF*SIN(ALFAF)*VMAG(1))/(VMAG(2)-VMAG(1)) E 0910
93. GO TO 85 E 0920
94. 60 ALIL=-VINF*SIN(ALFAF) E 0930
95. BLIL=(VC-ALIL*VMAG(1))/VMAG(2) E 0940
96. IF (ICTLPT.EQ.0) GO TO 85 E 0950
97. RHORAT=RHOCOP/RHOTOT E 0960
98. VCPINC=VCP E 0970
99. 65 VTEST=VCPINC+(VCP*(RHORAT)**(VCPINC/VCPBAR)-VCPINC)/(1.-VCPINC*ALOE 0980
100. 1G(RHORAT)/VCPBAR) E 0990
101. IF (ABS((VCPINC-VTEST)/VCPINC).LE.1.E-05) GO TO 70 E 1000
102. VCPINC=VTEST E 1010
103. GO TO 65 E 1020
104. 70 BLIL=(VCPINC+ALIL*T(ICTLPT,1)-CLIL*V2(ICTLPT))/(1-T(ICTLPT,2)) E 1030
105. IF (ALFAF.EQ.999.*PI/180) GO TO 75 E 1040
106. VMAG(1)=-T(ICTLPT,1) E 1050
107. VMAG(2)=-T(ICTLPT,2) E 1060
108. VMAG(3)=-V2(ICTLPT) E 1070
109. GO TO 85 E 1080
110. 75 ARE=-VC/VMAG(2)+T(ICTLPT,2)-VCPINC E 1090
111. ESS=-T(ICTLPT,1)+VMAG(1)/VMAG(2)+T(ICTLPT,2) E 1100
112. CLIL=(-ARE*V2(ICTLPT)-ESS*SQRT(VINF*VINF*(V2(ICTLPT)**2+ESS*ESS))- E 1110
113. IARE*ARE))/(V2(ICTLPT)**2+ESS*ESS) E 1120

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114.	VIF=VINF	E	1130
115.	IF(VINF.EQ.0.)VIF=CLIL	E	1140
116.	ALIL=SQRT(VIF*VIF-CLIL*CLIL)	E	1150
117.	BLIL=(VC-ALIL*VMAG(1))/VMAG(2)	E	1160
118.	ALFAF=ATAN(CLIL/ALIL)-90.*PI0180	E	1170
119.	ALF=ALFAF/PI0180	E	1180
120.	WRITE (6,80)ALF	E	1190
121.	80 FORMAT(10 ALFAF HAS BEEN CALCULATED FROM WDOT,VINF, AND CONTROL PE	PE	1200
122.	10TNT PRESSURE = ',E12.4,' DEG')	E	1210
123.	85 ALFAF=ALFAF/PI0180	E	1220
124.	RETURN	E	1230
125.	END	E	1240

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50. INFC		51 JAN 77	16
1.	SUBROUTINE INFC	P	0000
2.C		P	0010
3.C	INLET FORCE CALCULATION	P	0020
4.C		P	0030
5.	DIMENSION XTEST(10)	P	0040
6.	DIMENSION VABS(4),VORD(4)	P	0050
7.	DIMENSION XHB(200),YH(200),PSPTHC(200),PSOPTH(200),SDH(200)	P	0060
8.	1,XSR(200),YS(200),PSPTSC(200),PSOPTS(200),SDS(200),XHC(220),	P	0070
9.	2XH(220),XSC(200),XS(200)	P	0080
10.	DIMENSION VRESH(200),CPCH(200),VRESS(200)	P	0090
11.	DIMENSION SUBFCH(20),SUBFH(20),SUBFCS(20),SUBFS(20),	P	0100
12.	3SUBAFH(20),SUBAFS(20),SUBLHC(20),SUBLH(20),SUBLSC(20),SUDLS(20),	P	0110
13.	4SUBALH(20),SUBALS(20),THETA(20),SUBMHC(20),SUBMH(20),SUBMSC(20),	P	0120
14.	5SUBMS(20),SUBMHC(20),SUBDH(20),SUBDSC(20),SUBDS(20),SBMDHC(20),	P	0130
15.	6SBMDH(20),SBMDSC(20),SBMDS(20),YWINGG(10)	P	0140
16.	DIMENSION XOFF(100),YOFF(100),VKC(100),VRES(100),PSOPC(100),	P	0150
17.	1PSOP(100),SUBDPC(100),SUBDPC(100),VAFT(100)	P	0160
18.	DIMENSION SUBARI(20),SUBFRI(20),SUBFRC(20),SUBWDT(20),SUBWDC(20)	P	0170
19.	1,SUBMFX(20),SUBMFC(20),SUBMH(20),SUBMMC(20)	P	0180
20.	COMMON/FLAGS/IVORT,IGCOM,ISIG,ICURV,NONEWF,CASENO	P	0190
21.	COMMON/RCONT1/VC,VINF,ALFAF,TTOTAL,ELND,VA,PT	P	0200
22.	COMMON/RCONT2/PSTAT,TSTAT,WDOY,NX,KND,YRIH,YRIS,UTIP	P	0210
23.	COMMON/CONT1/QCA,PTC,PSPTCI,PI0180,ATOTAL,GRHO	P	0220
24.	REAL HFLUX,HFLUXC,HMFLX,HMFLXC	P	0230
25.	REAL MRESHC,MRESH,MRESSC,MRESS,LRFSHC,LRESH,LRESSC,LRESS	P	0240
26.	REAL MINF,MC,LHC,LH,LSC,LS,MLHC,MLH,MLSC,MDS,MDSC,MDH,MDHC,MLS	P	0250
27.	REAL LTC,LT,MLTC,MLI,MDTC,MDT,MRTC,MRT,LRTC,LRT,HFLXP,HFLXPC	P	0260
28.	1,LIFT,LIFTC	P	0270
29.	COMMON/JAN1/NL,KK,J	P	0280
30.	DATA VABS/6H ,6H ,6H ,6H ,6H ,6H ,VORD/6H ,6H	P	0290
31.	1 ,6H ,6H /	P	0300
32.	DATA CAPR/1715.637,0/32.174/	P	0310
33.	PI0180 = 3.14159265/180.	P	0320
34.C	READ(5,1003) ZO,CASENO,NWING,(YWINGG(I),I=2,NWING)	P	0330
35.	ZO=0.	P	0340
36.	NWING=1	P	0350
37.	10 FORMAT (F8.2,A6,2X,I8,7F8.2)	P	0360
38.	ITEST = 0	P	0370
39.	DO 110 IY=1,NWING	P	0380
40.	REWIND 4	P	0390
41.	READ(4) NCLO,NCHT,NTHIN,NPHIN,RHOST,(XTEST(IU),IU=1,10)	P	0400
42.	READ(4) YRIHUB,YRISHR,YWINGG(1)	P	0410
43.	READ(4) NTHETA	P	0420
44.	15 YWING = YWINGG(IY)	P	0430
45.	DO 105 N=1,NTHETA	P	0440
46.	READ(4) VC,VINF,ALFAF,TTOTAL	P	0450
47.	ALFAF=ALFAF*PI0180	P	0460
48.C		P	0470
49.C	THETA IN DEGREES	P	0480
50.C		P	0490
51.	READ(4) THETA(N)	P	0500
52.	THETA(N)= THETA(N)*PI0180	P	0510
53.	READ(4) II	P	0520
54.	READ(4) (XHB(I),YH(I),PSPTHC(I),PSOPTH(I),SDH(I),VRESH(I),	P	0530
55.	II=1,II)	P	0540
56.	READ(4) JJ	P	0550

57.	READ(4)	(XSR(I),YS(I),PSPTSC(I),PSOPTS(I),SDS(I),VRESS(I),	P	0560
58.	II=1,JJ)		P	0570
59.	IF (IY.EQ.1) GO TO 25		P	0580
60.	JJJ = 0		P	0590
61.	DO 20 I=1,JJ		P	0600
62.	IF (YS(I).GT.YWING) GO TO 20		P	0610
63.	JJJ = JJJ + 1		P	0620
64.	20 CONTINUE		P	0630
65.	JJ = JJJ + 1		P	0640
66.	25 READ(4) NOFF		P	0650
67.	READ (4) XOFF(I),YOFF(I),VXC(I),VRES(I),PSOPC(I),PSOP(I),VAFT(I)		P	0660
68.	NOFM1 = NOFF-1		P	0670
69.	READ (4) (XOFF(I),YOFF(I),VXC(I),VRES(I),PSOPC(I),PSOP(I),		P	0680
70.	1 VAFT(I),I=2,NOFM1)		P	0690
71.	READ (4) XOFF(NOFF),YOFF(NOFF),VXC(NOFF),VRES(NOFF),PSOPC(NOFF),		P	0700
72.	1 PSOP(NOFF),VAFT(NOFF)		P	0710
73.	II= II+1		P	0720
74.	IM = II-1		P	0730
75.	I= II		P	0740
76.	DO 30 L=1,IM		P	0750
77.	PSPTH(I)= PSPTH(I-1)		P	0760
78.	PSOPTH(I)= PSOPTH(I-1)		P	0770
79.	SDH(I) = SDH(I-1)		P	0780
80.	XHB(I) = XHB(I-1)		P	0790
81.	YH(I) = YH(I-1)		P	0800
82.	VRESH(I) = VRESH(I-1)		P	0810
83.	CPCH(I) = CPCH(I-1)		P	0820
84.	30 I = I-1		P	0830
85.	35 NL = 1		P	0840
86.	J = II		P	0850
87.	KX= 1		P	0860
88.	CALL LGRNGE (YH,PSPTH,YRIHUB,ANS)		P	0870
89.	PSPTH(II)=ANS		P	0880
90.	CALL LGRNGE (YH,PSOPTH,YRIHUB,ANS)		P	0890
91.	PSOPTH(II)= ANS		P	0900
92.	CALL LGRNGE (YH,SDH,YRIHUB,ANS)		P	0910
93.	SDH(II)= ANS		P	0920
94.	CALL LGRNGE (YH,XHB,YRIHUB,ANS)		P	0930
95.	XHB(II)= ANS		P	0940
96.	YH(II)= YRIHUB		P	0950
97.	J=JJ		P	0960
98.	CALL LGRNGE (YS,PSPTSC,YRISHR,ANS)		P	0970
99.	PSPTSC(I) = ANS		P	0980
100.	CALL LGRNGE (YS,PSPTSC,YWING,ANS)		P	0990
101.	PSPTSC(JJ)= ANS		P	1000
102.	CALL LGRNGE (YS,PSOPTS,YRISHR,ANS)		P	1010
103.	PSOPTS(I)= ANS		P	1020
104.	CALL LGRNGE (YS,PSOPTS,YWING,ANS)		P	1030
105.	PSOPTS(JJ)= ANS		P	1040
106.	CALL LGRNGE (YS,SDS,YRISHR,ANS)		P	1050
107.	SDS(I)= ANS		P	1060
108.	CALL LGRNGE (YS,SDS,YWING,ANS)		P	1070
109.	SDS(JJ)= ANS		P	1080
110.	CALL LGRNGE (YS,XSR,YRISHR,ANS)		P	1090
111.	XSR(I)= ANS		P	1100
112.	CALL LGRNGE (YS,XSR,YWING,ANS)		P	1110
113.	XSR(JJ)= ANS		P	1120

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114.	YS(I) = YRISHR	P	1130
115.	YS(IJJ) = YWING	P	1140
116.	YH(I) = 0.0	P	1150
117.	SDH(I) = SDH(2) - YH(2)	P	1160
118.C		P	1170
119.C	CALC CONSTANT VALUES	P	1180
120.C		P	1190
121.	RHOT = PT/(CAPR*TTOTAL)	P	1200
122.	RHORAT = RHOT/RHOST	P	1210
123.	IF (PSTAT.NE.0.0) RHOT = RHOST	P	1220
124.	IF (PSTAT.EQ.0.0) RHORAT = 1.0	P	1230
125.	ATOTAL = 49.0*SQRT(TTOTAL)	P	1240
126.	CON2 = VC/ATOTAL	P	1250
127.	RCORT = (1.0-.2*CON2**2)**2.5	P	1260
128.	PA = PT-.5*RHOT*VINP**2	P	1270
129.	CON1 = 1.0-.2*(VINP/ATOTAL)**2	P	1280
130.	PAC = PTC*CON1**3.5	P	1290
131.	MINF = (VINP/ATOTAL)/(CON1**5)	P	1300
132.	MC = CON2/((1.0-.2*CON2**2)**5)	P	1310
133.C		P	1320
134.C	WRITE (INPUT AND CONSTANTS	P	1330
135.C		P	1340
136.	IF (N.EQ.1) WRITE (6,175)CASENO,YRHHUB,YRISHR,YWING,VC,VINF,ALFAF,	P	1350
137.	TTOTAL,RHOT,PA,PAC,MINF,MC,NTHETA	P	1360
138.C	WRITE (6,2018) THETA(N),XHD(I),YH(I),PSPTH(I),PSOPTH(I),SDH(I),	P	1370
139.C	1 VRESH(I),CPCH(I),I=1,II)	P	1380
140.C	WRITE (6,2022) (XSR(I),YS(I),PSPTSC(I),PSOPTS(I),SDS(I),	P	1390
141.C	1 VRESS(I),CPCS(I),I=1,JJ)	P	1400
142.C	WRITE(6,2023) (XOFF(I),YOFF(I),VXC(I),VAFT(I),PSOPC(I),PSOP(I),VREF	P	1410
143.C	1S(I),CPC(I),I=1,NOFF)	P	1420
144.	DO 40 I=1,II	P	1430
145.	XHC(I) = PSPTH(I)*YH(I)	P	1440
146.	40 XH(I) = PSOPTH(I)*YH(I)	P	1450
147.	DO 45 J=1,JJ	P	1460
148.	XSC(J) = PSPTSC(J)*YS(J)	P	1470
149.	XS(J) = PSOPTS(J)*YS(J)	P	1480
150.	45 CONTINUE	P	1490
151.	CALL TRAP(SDH,XHC,ANS,II)	P	1500
152.	SUBFCH(N) = ANS	P	1510
153.	CALL TRAP(SDH,XH,ANS,II)	P	1520
154.	SUBFH(N) = ANS	P	1530
155.	CALL TRAP(SDS,XSC,ANS,JJ)	P	1540
156.	SUBFCS(N) = ANS	P	1550
157.	CALL TRAP(SDS,XS,ANS,JJ)	P	1560
158.	SUBFS(N) = ANS	P	1570
159.	CALL TRAP(SDH,YH,ANS,II)	P	1580
160.	SUBAFH(N) = ANS	P	1590
161.	CALL TRAP(SDS,YS,ANS,JJ)	P	1600
162.	SUBAFS(N) = ANS	P	1610
163.	CALL TRAP(YH,XHC,ANS,II)	P	1620
164.	SUBLHC(N) = ANS	P	1630
165.	CALL TRAP(YH,XH,ANS,II)	P	1640
166.	SUBLH(N) = ANS	P	1650
167.	CALL TRAP(YS,XSC,ANS,JJ)	P	1660
168.	SUBLSC(N) = ANS	P	1670
169.	CALL TRAP(YS,XS,ANS,JJ)	P	1680
170.	SUBLS(N) = ANS	P	1690

171.	CALL TRAP(YH,YH,ANS,II)	P	1700
172.	SUBALH(N)=ANS	P	1710
173.	CALL TRAP(YS,YS,ANS,JJ)	P	1720
174.	SUBALS(N)=ANS	P	1730
175.	PACOPT = PAC/PTC	P	1740
176.	PAOPT= PA/PT	P	1750
177.	DO 50 I=1,II	P	1760
178.	XHC(I)= -PSPTH(I)*YH(I)**2	P	1770
179.	XHI(I)= -PSOPH(I)*YH(I)**2	P	1780
180.	50 CONTINUE	P	1790
181.	DO 55 J=1,JJ	P	1800
182.	XSC(J)= -PSPTSC(J)*YS(J)**2	P	1810
183.	XS(J)= -PSOPTS(J)*YS(J)**2	P	1820
184.	55 CONTINUE	P	1830
185.	COST = COS(THETA(N))	P	1840
186.	CALL TRAP(YH,XHC,ANS,II)	P	1850
187.	SUBMHC(N)= COST*ANS	P	1860
188.	CALL TRAP(YH,XH,ANS,II)	P	1870
189.	SUBMH(N)= COST*ANS	P	1880
190.	CALL TRAP(YS,XSC,ANS,JJ)	P	1890
191.	SUBMSC(N)= COST*ANS	P	1900
192.	CALL TRAP(YS,XS,ANS,JJ)	P	1910
193.	SUBMS(N)= COST*ANS	P	1920
194.	DO 60 I=1,II	P	1930
195.	XHC(I) = PSPTH(I)*YH(I)	P	1940
196.	XHI(I) = PSOPH(I)*YH(I)	P	1950
197.	60 CONTINUE	P	1960
198.	DO 65 J=1,JJ	P	1970
199.	XSC(J) = PSPTSC(J)*YS(J)	P	1980
200.	XS(J) = PSOPTS(J)*YS(J)	P	1990
201.	65 CONTINUE	P	2000
202.	CALL TRAP(XHB,XHC,ANS,II)	P	2010
203.	SUBDHC(N)= COST*ANS	P	2020
204.	CALL TRAP(XHB,XH,ANS,II)	P	2030
205.	SUBDH(N)= COST*ANS	P	2040
206.	CALL TRAP(XSR,XSC,ANS,JJ)	P	2050
207.	SUBDSC(N)=COST*ANS	P	2060
208.	CALL TRAP(XSR,XS,ANS,JJ)	P	2070
209.	SUBDS(N)= COST*ANS	P	2080
210.	DO 70 I=1,II	P	2090
211.	XHC(I)= PSPTH(I)*YH(I)*(XHB(I)-Z0)	P	2100
212.	70 XHI(I)= PSOPH(I)*YH(I)*(XHB(I)-Z0)	P	2110
213.	DO 75 J=1,JJ	P	2120
214.	XSC(J)= PSPTSC(J)*YS(J)*(XSR(J)-Z0)	P	2130
215.	75 XS(J)= PSOPTS(J)*YS(J)*(XSR(J)-Z0)	P	2140
216.	CALL TRAP(XHB,XHC,ANS,II)	P	2150
217.	SUBDHC(N)= ANS*COST	P	2160
218.	CALL TRAP(XHB,XH,ANS,II)	P	2170
219.	SUBDH(N)=ANS*COST	P	2180
220.	CALL TRAP(XSR,XSC,ANS,JJ)	P	2190
221.	SUBDSC(N)= ANS*COST	P	2200
222.	CALL TRAP(XSR,XS,ANS,JJ)	P	2210
223.	SUBDS(N)=ANS*COST	P	2220
224.C		P	2230
225.C	ROTOR INLET CALCS OFF-BODY POINTS FROM COMBYN	P	2240
226.C		P	2250
227.	CALL TRAP(YOFF,YOFF,ANS,NOFF)	P	2260

226.	SUBARI(N) = ANS	P	2270
229.	DO 80 I=1,NOFF	P	2280
230.	XSC(I) = PSOPC(I)*YOFF(I)	P	2290
231.	80 XSI(I) = PSOP(I)*YOFF(I)	P	2300
232.	CALL TRAP (YOFF,XS,ANS,NOFF)	P	2310
233.	SUBFRI(N) = ANS	P	2320
234.	CALL TRAP (YOFF,XSC,ANS,NOFF)	P	2330
235.	SUBFRC(N) = ANS	P	2340
236.	DO 85 I=1,NOFF	P	2350
237.	XS(I) = VXC(I)*YOFF(I)	P	2360
238.	85 XSC(I) = PSOPC(I)**(1.0/1.4)*XS(I)	P	2370
239.	CALL TRAP(YOFF,XS,ANS,NOFF)	P	2380
240.	SUBWDY(N) = ANS	P	2390
241.	CALL TRAP(YOFF,XSC,ANS,NOFF)	P	2400
242.	SUBWDC(N) = ANS	P	2410
243.	DO 90 I=1,NOFF	P	2420
244.	XS(I) = XS(I)*VXC(I)	P	2430
245.	90 XSC(I) = XSC(I)*VXC(I)	P	2440
246.	CALL TRAP (YOFF,XS,ANS,NOFF)	P	2450
247.	SUBMFX(N) = ANS	P	2460
248.	CALL TRAP (YOFF,XSC,ANS,NOFF)	P	2470
249.	SUBMFC(N) = ANS	P	2480
250.	DO 95 I=1,NOFF	P	2490
251.	XS(I) = XS(I)*YOFF(I)	P	2500
252.	95 XSC(I) = XSC(I)*YOFF(I)	P	2510
253.	CALL TRAP (YOFF,XS,ANS,NOFF)	P	2520
254.	SUBJMH(N) = COST*ANS	P	2530
255.	CALL TRAP (YOFF,XSC,ANS,NOFF)	P	2540
256.	SUBJMC(N) = COST*ANS	P	2550
257.	DO 100 I=1,NOFF	P	2560
258.	XS(I) = VXC(I)*VAFT(I)*YOFF(I)	P	2570
259.	XSC(I) = XS(I)*PSOPC(I)**(1.0/1.4)	P	2580
260.	100 CONTINUE	P	2590
261.	CALL TRAP (YOFF,XS,ANS,NOFF)	P	2600
262.	SUBDFY(N) = ANS	P	2610
263.	CALL TRAP (YOFF,XSC,ANS,NOFF)	P	2620
264.	SUBDXC(N) = ANS	P	2630
265.	105 CONTINUE	P	2640
266.	ARIXT = 3.14159265*(YOFF(NOFF)**2-YOFF(1)**2)/144.	P	2650
267.	ALXCTH = 3.14159265*(YRIHUB**2)/144.	P	2660
268.	ALXCTS = 3.14159265*(YWING**2-YRISHR**2)/144.	P	2670
269.	T0144=2.0/144.	P	2680
270.	CON3= -T0144*PT	P	2690
271.	CON3C = -T0144*PTC	P	2700
272.	CALL TRAP (THETA,SUBFCH,ANS,NTHETA)	P	2710
273.	FHC=ANS*CON3C	P	2720
274.	CALL TRAP (THETA,SUBFH,ANS,NTHETA)	P	2730
275.	FH = ANS*CON3	P	2740
276.	CALL TRAP (THETA,SUBFCS,ANS,NTHETA)	P	2750
277.	FSC=-ANS*CON3C	P	2760
278.	CALL TRAP (THETA,SUBFS,ANS,NTHETA)	P	2770
279.	FSE=-ANS*CON3	P	2780
280.	CALL TRAP (THETA,SUBAFH,ANS,NTHETA)	P	2790
281.	AFH= ANS*T0144	P	2800
282.	CALL TRAP (THETA,SUBAFS,ANS,NTHETA)	P	2810
283.	AFSE=-ANS*T0144	P	2820
284.	PACAFH = PAC*AFH	P	2830

285.	PAAFH = PA*AFH	P	2840
286.	PACAFS = PAC*AFS	P	2850
287.	PAAFS = PA*AFS	P	2860
288.	FHC = FHC + PACAFH	P	2870
289.	FH = FH + PAAFH	P	2880
290.	FSC = FSC + PACAFS	P	2890
291.	FS = FS + PAAFS	P	2900
292.	CALL TRAP (THETA, SUBLHC,ANS,NTHETA)	P	2910
293.	LHC= CON3C*ANS	P	2920
294.	CALL TRAP (THETA, SUBLH,ANS,NTHETA)	P	2930
295.	LH = CON3*ANS	P	2940
296.	CALL TRAP (THETA, SUBLSC,ANS,NTHETA)	P	2950
297.	LSC= CON3C*ANS	P	2960
298.	CALL TRAP (THETA, SUBLS,ANS,NTHETA)	P	2970
299.	LS = CON3*ANS	P	2980
300.	CALL TRAP (THETA, SUBALH,ANS,NTHETA)	P	2990
301.	ALH= T0144*ANS	P	3000
302.	CALL TRAP (THETA, SUBALS,ANS,NTHETA)	P	3010
303.	ALS = T0144*ANS	P	3020
304.	PACALH = PAC*ALH	P	3030
305.	PAALH = PA*ALH	P	3040
306.	PACALS = PAC*ALS	P	3050
307.	PAALS = PA*ALS	P	3060
308.	LHC = LHC + PACALH	P	3070
309.	LH = LH + PAALH	P	3080
310.	LSC = LSC + PACALS	P	3090
311.	LS = LS + PAALS	P	3100
312.	T01728= 2.D/1728.	P	3110
313.	CALL TRAP (THETA, SUBMHC,ANS,NTHETA)	P	3120
314.	MLHC =-ANS*T01728*PTC	P	3130
315.	CALL TRAP (THETA, SUBMH,ANS,NTHETA)	P	3140
316.	MLH=-ANS*T01728*PT	P	3150
317.	CALL TRAP (THETA, SUBMSC,ANS,NTHETA)	P	3160
318.	MLSC=-ANS*T01728*PTC	P	3170
319.	CALL TRAP (THETA, SUBMS,ANS,NTHETA)	P	3180
320.	MLS=-ANS*T01728*PT	P	3190
321.	CALL TRAP (THETA, SUBDHC,ANS,NTHETA)	P	3200
322.	DHC = CON3C*ANS	P	3210
323.	CALL TRAP (THETA, SUBDH,ANS,NTHETA)	P	3220
324.	DH = CON3*ANS	P	3230
325.	CALL TRAP (THETA, SUBDSC,ANS,NTHETA)	P	3240
326.	DSC = CON3C*ANS	P	3250
327.	CALL TRAP (THETA, SUBDS,ANS,NTHETA)	P	3260
328.	DS = CON3*ANS	P	3270
329.	CALL TRAP (THETA, SBMDHC,ANS,NTHETA)	P	3280
330.	MDHC= T01728*PTC*ANS	P	3290
331.	CALL TRAP (THETA, SBMDH,ANS,NTHETA)	P	3300
332.	MDH= T01728*PT*ANS	P	3310
333.	CALL TRAP (THETA, SBMDSC,ANS,NTHETA)	P	3320
334.	MDSC= T01728*PTC*ANS	P	3330
335.	CALL TRAP (THETA, SBMDS,ANS,NTHETA)	P	3340
336.	MDS= T01728*PT*ANS	P	3350
337.C		P	3360
338.C	SECOND INTEGRATION FOR OFF BODY POINTS	P	3370
339.C		P	3380
340.	CONS = T01728*G*RHOT	P	3390
341.	CON4 = T0144*G*RHOT	P	3400

342.	CON7 = T01728*RHOT	P	3410
343.	CON6 = T0144*RHOT	P	3420
344.	CALL TRAP (THETA, SUBARI, ANS, NTHETA)	P	3430
345.	ARI = T0144*ANS	P	3440
346.	CALL TRAP (THETA, SUBFRI, ANS, NTHETA)	P	3450
347.	FRI = PA*ARI+CON3*ANS	P	3460
348.	CALL TRAP (THETA, SUBFRC, ANS, NTHETA)	P	3470
349.	FRC = PAC*ARI+CON3C*ANS	P	3480
350.	CALL TRAP (THETA, SUBWDY, ANS, NTHETA)	P	3490
351.	WDC = CON4*ANS	P	3500
352.	CALL TRAP (THETA, SUBWDC, ANS, NTHETA)	P	3510
353.	WDC = CON4*ANS * RHORAT	P	3520
354.	CALL TRAP (THETA, SUBWFX, ANS, NTHETA)	P	3530
355.	WFLUX = CON6*ANS	P	3540
356.	CALL TRAP (THETA, SUBWFC, ANS, NTHETA)	P	3550
357.	WFLXC = CON6*ANS * RHORAT	P	3560
358.	CALL TRAP (THETA, SUBWFM, ANS, NTHETA)	P	3570
359.	WFLX = CON7*ANS	P	3580
360.	CALL TRAP (THETA, SUBWMC, ANS, NTHETA)	P	3590
361.	WFLXC = CON7*ANS * RHORAT	P	3600
362.	CALL TRAP (THETA, SUBWFX, ANS, NTHETA)	P	3610
363.	DFLUX = ANS*CON6	P	3620
364.	CALL TRAP (THETA, SUBWXC, ANS, NTHETA)	P	3630
365.	DFLXC = ANS*CON6* RHORAT	P	3640
366.	RHC = SORT(LHC**2+DHC**2)	P	3650
367.	RH = SORT(LH**2+DH**2)	P	3660
368.	RSC = SORT(LSC**2+DSC**2)	P	3670
369.	RS = SORT(LS**2+DS**2)	P	3680
370.	MRESHC = MLHC + MDHC	P	3690
371.	MRESH = MLH + MDH	P	3700
372.	MRESSC = MLS + MDS	P	3710
373.	MRESS = MLS + MDS	P	3720
374.	SINAL = SIN(ALFAF)	P	3730
375.	COSAL = COS(ALFAF)	P	3740
376.	LRESHC = LHC*COSAL - DHC*SINAL	P	3750
377.	LRESH = LH*COSAL - DH*SINAL	P	3760
378.	LRESSC = LSC*COSAL - DSC*SINAL	P	3770
379.	LRESS = LS*COSAL - DS*SINAL	P	3780
380.	DRESHC = DHC*COSAL + LHC*SINAL	P	3790
381.	DRESH = DH*COSAL + LH*SINAL	P	3800
382.	DRESSC = DSC*COSAL + LSC*SINAL	P	3810
383.	DRESS = DS*COSAL + LS*SINAL	P	3820
384.	RBARHC = 12.*MLHC/LHC	P	3830
385.	RBARH = 12.*MLH/LH	P	3840
386.	RBARSC = 12.*MLSC/LSC	P	3850
387.	RBAR = 12.*MLS/LS	P	3860
388.	ZBARHC = 12.*MDHC/DHC	P	3870
389.	ZBARH = 12.*MDH/DH	P	3880
390.	ZBARSC = 12.*MDS/DSC	P	3890
391.	ZBAR = 12.*MDS/DS	P	3900
392.	FRHC = SORT(LRESHC**2+DRESHC**2)	P	3910
393.	FRH = SORT(LRESH**2+DRESH**2)	P	3920
394.	FRSC = SORT(LRESSC**2+DRESSC**2)	P	3930
395.	FRS = SORT(LRESS**2+DRESS**2)	P	3940
396.	FTC = FHC+FSC	P	3950
397.	FT = FH + FS	P	3960
398.	AFT = AFH + AFS	P	3970

399.	$LYC = LHC + LSC$	P	3980
400.	$LT = LH + LS$	P	3990
401.	$ALT = ALH + ALS$	P	4000
402.	$MLYC = MLHC + MLSC$	P	4010
403.	$MLT = MLH + MLS$	P	4020
404.	$RBARTC = 12.*MLTC/LTC$	P	4030
405.	$RBART = 12.*MLT/LT$	P	4040
406.	$DTC = DHC + DSC$	P	4050
407.	$DT = DH + DS$	P	4060
408.	$MDTC = MDHC + MDSC$	P	4070
409.	$MDT = MDH + MDS$	P	4080
410.	$ZBARTC = 12.*MDTC/DTC$	P	4090
411.	$ZBART = 12.*MDT/DT$	P	4100
412.	$MRTC = MRESHC + MRESSC$	P	4110
413.	$MRT = MRESH + MRESS$	P	4120
414.	$LRTC = LTC * COSAL - DTC * SINL$	P	4130
415.	$LRT = LT * COSAL - DT * SINL$	P	4140
416.	$DRTC = DTC * COSAL + LTC * SINL$	P	4150
417.	$DRT = DT * COSAL + LT * SINL$	P	4160
418.	$FRTC = SQRT(LRTC**2 + DRTC**2)$	P	4170
419.	$FRT = SQRT(LRT**2 + DRT**2)$	P	4180
420.	$VAFTAV = G * DFLUX / WDOT$	P	4190
421.	$VAFTAC = G * DFLUXC / WDOTC$	P	4200
422.	$VIOVC = VINFC / VC$	P	4210
423.	$VIMVV = (VINFC - VAFTAV) / VC$	P	4220
424.	$VIMVC = (VINFC - VAFTAC) / VC$	P	4230
425.	$DOL = DRT / LRT$	P	4240
426.	$DOLC = DRTC / LRTC$	P	4250
427.	$ONBPI = 180./3.14159265$	P	4260
428.C		P	4270
429.C	MISALIGNMENT PARAMETERS	P	4280
430.C		P	4290
431.	$DELV = ATAN2(VAFTAV, VC) * ONBPI$	P	4300
432.	$DELVC = ATAN2(VAFTAC, VC) * ONBPI$	P	4310
433.	$DELM = ATAN2(DFLUX, MFLUX) * ONBPI$	P	4320
434.	$DELMC = ATAN2(DFLUXC, MFLUXC) * ONBPI$	P	4330
435.	$MFLXP = FRT + LT$	P	4340
436.	$MFLXPC = FRIC + LTC$	P	4350
437.	$DMFLX = MFLUX - MFLXP$	P	4360
438.	$DMFLXC = MFLUXC - MFLXPC$	P	4370
439.	$PCDMF = DMFLX / MFLUX$	P	4380
440.	$PCDMFC = DMFLXC / MFLUXC$	P	4390
441.	$PCD2L = (MFLUX - 2.0 * LRT) / MFLUX$	P	4400
442.	$PCD2LC = (MFLUXC - 2.0 * LRTC) / MFLUXC$	P	4410
443.	$LIFT = (WDOT * VC / G - FRT) * COSAL$	P	4420
444.	$LIFTC = (WDOTC * VC / G - FRIC) * COSAL$	P	4430
445.	$DRAGP = (WDOT / G) * (VC * SINL + VINFC) - FRT * SINL$	P	4440
446.	$DRAGPC = (WDOTC / G) * (VC * SINL + VINFC) - FRIC * SINL$	P	4450
447.	$DRAG = DRAGP - DFLUX * COSAL$	P	4460
448.	$DRAGC = DRAGPC - DFLUXC * COSAL$	P	4470
449.	$ALFAF = ALFAF / PI * 180$	P	4480
450.	WRITE (6,165)	P	4490
451.	WRITE (6,135)	P	4500
452.	WRITE (6,140) FHC, FH, AFH, FSC, FS, AFS, FTC, FT, AFT	P	4510
453.	WRITE (6,150)	P	4520
454.	WRITE (6,145) LHC, LH, ALH, LSC, LS, ALS, LTC, LT, ALT, MLHC, MLH, MLS, MLC, MLT, RBARHC, RBARH, RBARSC, RBARS, RBARTC, RBART	P	4530
455.		P	4540

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456. WRITE (6,155) P 4550
457. WRITE (6,170) DHC,DH,DSC,DS,DTC,DT,MDHC,MDH,MDSC,MDS,MDTC,MDT,ZFARHP P 4560
458. 1C,ZBAPH,ZBARSC,ZBARS,ZBARTC,ZBART P 4570
459. WRITE (6,160) ALFAT,MRESHC,MRESH,MRESSC,MRESS,MRTC,MRT,LRESHC,LRESHP P 4580
460. 1,LRESSC,LRESS,LRTC,LRT,DRESHC,DRESH,DRESSC,DRESS,DRTC,DRT,FRHC,FRHP P 4590
461. 1,FRSC,FRS,FRYC,FRY P 4600
462. WRITE (6,195) XOFF (1) P 4610
463. WRITE (6,200) ARI,FRI,WOOT,MFLUX,MMFLX,DFLUX,VAFTAV,ARXT,FRIC,WOOT P 4620
464. 1C,MFLXC,MMFLXC,DFLXC,VAFTAC P 4630
465. WRITE (6,205) VIOVC,VIMV,VIMVC,DOL,DOLC P 4640
466. WRITE (6,210) DELV,DELVC,DELH,DELMC,MFLXP,DMFLX,PCDNF,PCD2L,MFLXPC,P 4650
467. 1DMFLXC,PCDMFC,PCD2LC P 4660
468. WRITE (6,215) LIFT,LIFTC,DRAGP,DRAGPC,DRAG,DRAGC P 4670
469. 110 CONTINUE P 4680
470. 115 FORMAT (7E11.4) P 4690
471. 120 FORMAT (I5) P 4700
472. 125 FORMAT (4E11.4,2F7.5,2E11.4) P 4710
473. 130 FORMAT (5E15.6) P 4720
474. 135 FORMAT (1HD,20X,23H*****HUR*****16X,23H*****SHROUD*P 4730
475. 1*****17X,22HTOTAL (HUB AND SHROUD)/15X,8HCOMPRESS,5X,10HINCOMP 4740
476. 2PRESS,5X,4HAREA,7X,8HCOMPRESS,5X,10HINCOMPRESS,5X,4HAREA,7X,8HCOMP 4750
477. 3RESS,5X,10HINCOMPRESS,5X,4HAREA) P 4760
478. 140 FORMAT (3X,5HTOTAL/ 3X,5HFORCE,4X,1P9E13.4/ ) P 4770
479. 145 FORMAT (5X,5HFORCE,2X,1P9E13.4/5X,6HMOMENT,1X,1P2E13.4,13X,1P2E13.P 4780
480. 14,13X,1P2E13.4,75X,7HMHOM.ARM,1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/ ) P 4790
481. 150 FORMAT (3X,4HLIFT) P 4800
482. 155 FORMAT (3X,4HDRAG) P 4810
483. 160 FORMAT (3X,10HRESULTS,10X,18HANGLE OF ATTACK = ,1PE12.5,1X,17HFP 4820
484. *OR LIFT AND DRAG/ 5X,6HMOMENT,1X,1P2E13.4,13X,1P2E13.4,13X,P 4830
485. 11P2E13.4/5X,4HLIFT,3X,1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/5X,4HDRAGP 4840
486. 2,3X,1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/5X,5HFORCE,2X,1P2E13.4,13X,P 4850
487. 41P2E13.4,13X,1P2E13.4) P 4860
488. 165 FORMAT (1HD,50X,17HSURFACE INTEGRALS/ ) P 4870
489. 170 FORMAT (5X,5HFORCE,2X,1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/ P 4880
490. 1 5X,6HMOMENT,1X,1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/ P 4890
491. 2 5X,7HMOM.ARM, 1P2E13.4,13X,1P2E13.4,13X,1P2E13.4/ ) P 4900
492. 175 FORMAT (1H1,9X,10HCASE -- ,A6//10X,9HYTESTH = ,1PE12.5,3X,9HYTESP 4910
493. 11S = ,1PE12.5,3X,8HYWING = ,1PE12.5//10X,9HVC = ,1PE12.5,3X,9HP 4920
494. 2VINF = ,1PE12.5,3X,8HALFAT = ,1PE12.5,2X,9HTTOTAL = ,1PE12.5//10P 4930
495. 3X,9HRHOT = ,1PE12.5,3X,9HPA = ,1PE12.5,3X,8HPAC = ,1PE12.5P 4940
496. 4//10X,9HMINF = ,1PE12.5,3X,9HMC = ,1PE12.5//10X,9HNTHEA = P 4950
497. 5,15) P 4960
498. 180 FORMAT (1HD,9X,9HNTHEA = ,1PE12.5//47X,13H*****HUB****//15X,1HX,P 4970
499. 114X,1HY,14X,6HPSOPTC,13X,5HPSOPT,12X,1HS,12X,4HVRES,12X,2HCP/ P 4980
500. 241PE22.5,1P2E16.5,1PE19.5,1P3E15.5) P 4990
501. 185 FORMAT (1HD,44X,16H*****SHROUD*****//15X,1HX,14X,1HY,14X,6HPSOPTC,P 5000
502. 313X,5HPSOPT,12X,1HS,12X,4HVRES,12X,2HCP/(1PE22.5,1P2E16.5,1PE19.5,P 5010
503. 21P3E15.5)) P 5020
504. 190 FORMAT (1HD,43X, P 5030
505. 418H*****OFF BODY*****//10X,1HX,13X,1HY,14X,2HVX,14X,4HVAFT,11X,5HPP 5040
506. 45OPC,11X,4HPSOP,12X,4HVRES,12X,2HCP//11PE16.4,1PE13.4,1P3E16.4,1P3P 5050
507. 5E10.4)) P 5060
508. 195 FORMAT (1HD,35X,34HMEASURING STAT/ON INTEGRALS X = ,1PE12.5) P 5070
509. 200 FORMAT (1HD,33X,9HFORCE DUE,6X,6HWEIGHT,5X,8HMOMENTUM,6X,9HMOMENT P 5080
510. 1OF,9X,4HDRAG,7X,7HAVERAGE/14X,4HAREA,16X,9HTO PRESS.,7X,4HFLOW,8X,P 5090
511. 24HFLUX,8X,12HMOMENTUM FLX,6X,4HFLUX,8X,4HVAFT//3X,3HINT,5X,1PE12.5P 5100
512. 3,2X,6HINCOMP,2X,1PE11.4,1P3E13.4,1PE14.5,1PE14.4/ 3X,5HCXAC1, P 5110

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513.	43X,1PF12.5,2X,4HCOMP,4X,1PE11.4,1P3E13.4,1PC14.5,1PE14.4)	P	5120
514.	205 FORMAT (1HD,2X,11HVINF/VC = ,1PE11.4,2X,19HVINF-VAFTAV)/VC = ,1PP	P	5130
515.	1E11.4,2X,19HVINF-VAFTAC)/VC = ,1PE11.4/3X,6HD/L = ,1PE11.4,3X,8HP	P	5140
516.	2DC/LC = ,1PE11.4)	P	5150
517.	210 FORMAT (1HD,50X,23HMSALIGNMENT PARAMETERS/20X,7HDELV = ,1PE12.5,5P	P	5160
518.	1X,8HDELVC = ,1PE12.5,5X,7HDELM = ,1PE12.5,5X,8HDELMC = ,1PE12.5/	P	5170
519.	2 1HD,56X,11HCOMPARISONS/20X,9HMFLEX = ,1PE12.5,5X,9HDMFLX = ,	P	5180
520.	31PE12.5,5X,9HPCDMF = ,1PE12.5,5X,9HPCD2L = ,1PE12.5/	P	5190
521.	420X,9HMFLEXPC = ,1PE12.5,5X,9HDMFLXC = ,1PC12.5,5X,9HPCDMFC = ,	P	5200
522.	51PE12.5,5X,9HPCD2LC = ,1PC12.5)	P	5210
523.	215 FORMAT (1HD,2X,7HLIFT = ,1PE11.4,3X,8HLIFTC = ,1PE11.4,3X,8HDRAGP =P	P	5220
524.	1 ,1PE11.4,3X,9HDRAGPC = ,1PE11.4,3X,7HDRAG = ,1PE11.4,3X,8HDRAGC =P	P	5230
525.	2 ,1PE11.4)	P	5240
526.	RETURN	P	5250
527.	END	P	5260

SO.INTPL		19 OCT 76	12
1.	SUBROUTINE INTPOL (L,J,XI,IFLAG,VX,VRES,BETA,ALPH)	F	0000
2.C****		F	0010
3.C***	THIS SUBROUTINE INTERPOLATES AND DIFFERENTIATES	F	0020
4.C****		F	0030
5.	COMMON /ONOUT/ VRES(400),VP(400),BETA(400)	F	0040
6.	COMMON /GEABC/ VI	F	0050
7.	COMMON /RDOUT1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHURMX,NTMF	F	0060
8.	IN,NSPLY,VWING	F	0070
9.	COMMON /RDOUT2/ T(400,2),VYAX(200,2),VYCR(200),V2(400),V3(400),VZCF	F	0080
10.	IR(200)	F	0090
11.	DIMENSION V(400), B(400)	F	0100
12.	EPS=1.0E-6	F	0110
13.	M=J-1	F	0120
14.	N=J+1	F	0130
15.	A=1.0	F	0140
16.	DO 10 K=M,N	F	0150
17.	XDIF=XI-XON(K)	F	0160
18.	IF (XDIF.EQ.0.0) XDIF=EPS	F	0170
19.	A=A*XDIF	F	0180
20.	10 CONTINUE	F	0190
21.C		F	0200
22.C	IF THE REAKE X EQUALS THE ON BODY X THEN SET INTERPOLATED VALUES.	F	0210
23.C	TO THE VALUES ON BODY	F	0220
24.C		F	0230
25.	IF (ABS(XI-XON(J)).LE.1.0E-6) GO TO 55	F	0240
26.	DO 15 K=M,N	F	0250
27.	B(K)=1.0	F	0260
28.	DO 15 LL=M,N	F	0270
29.	IF (LL.EQ.K) GO TO 15	F	0280
30.	B(K)=B(K)*(XON(K)-XON(LL))	F	0290
31.	15 CONTINUE	F	0300
32.	VI=0.0	F	0310
33.	DUM=0.0	F	0320
34.	VINT=0.0	F	0330
35.	DO 35 II=M,N	F	0340
36.	XDIF=XI-XON(II)	F	0350
37.	IF (XDIF.EQ.0.0) XDIF=EPS	F	0360
38.	IF (IFLAG.GT.1) GO TO 25	F	0370
39.	IF (L.EQ.3) GO TO 20	F	0380
40.	V(II)=T(II,L)	F	0390
41.	GO TO 30	F	0400
42.	20 V(II)=V2(II)	F	0410
43.	GO TO 30	F	0420
44.	25 V(II)=VRES(II)	F	0430
45.	30 VI=VI+(A*YON(II))/(XDIF*B(II))	F	0440
46.	VINT=VINT+(A*V(II))/(XDIF*B(II))	F	0450
47.	IF (IFLAG.EQ.1) GO TO 35	F	0460
48.	V(II)=VP(II)	F	0470
49.	DUM=DUM+(A*V(II))/(XDIF*B(II))	F	0480
50.	35 CONTINUE	F	0490
51.	IF (IFLAG.EQ.1) GO TO 45	F	0500
52.	BETA=0.0	F	0510
53.	PSOP=0.0	F	0520
54.	DO 40 II=M,N	F	0530
55.	XDIF=XI-XON(II)	F	0540
56.	IF (XDIF.EQ.0.0) XDIF=EPS	F	0550

57.	BETA=BETA+(A*BETAON(111))/(XDIF*B(11))	F	0560
58.	40 CONTINUE	F	0570
59.	45 JK=J	F	0580
60.	50 AD=XI-XON(JK-1)	F	0590
61.	BD=XON(JK)-XI	F	0600
62.	PD=AD*(AD+BD)	F	0610
63.	P1=-(AD*BD)	F	0620
64.	P2=(AD+BD)*BD	F	0630
65.	AC=-BD	F	0640
66.	A1=AD-BD	F	0650
67.	A2=AD	F	0660
68.	DY=(AD*YON(JK-1))/PD+(A1*YI)/P1+(A2*YON(JK))/P2	F	0670
69.	ALPHA=ATAN(DY)	F	0680
70.	ALPH=ALPHA/(3.14159265/180.)	F	0690
71.	VX=VINT*COS(ALPHA)	F	0700
72.	VRES=VINT	F	0710
73.	IF (IFLAG.EQ.2) VX=DUM*COS(ALPHA)	F	0720
74.	RETURN	F	0730
75.	55 IF (L.EQ.3) VINT=V2(J)	F	0740
76.	VINT=Y(J,L)	F	0750
77.	IF (IFLAG.GT.1) VINT=VRESO(J)	F	0760
78.	YI=YON(J)	F	0770
79.	IF (IFLAG.NE.1) DIM=VP(J)	F	0780
80.	BETA=BETAON(J)	F	0790
81.	JK=J-1	F	0800
82.	GO TO 50	F	0810
83.	END	F	0820

50.LGRNG		19 OCT 76	12
1.	SUBROUTINE LGRNGE (X,Y,ARG,GIN)	Q	0000
2.	COMMON/JAN1/ MM,LL,N	Q	0010
3.	DIMENSION X(1), Y(50,1,20),GIN(1,20),A(10)	Q	0020
4.	EQUIVALENCE (XX,A(1)),(X0,A(2)),(X1,A(3)),(X2,A(4)),(X3,A(5)),	Q	0030
5.	1 (Y0,A(6)),(Y1,A(7)),(Y2,A(8)),(Y3,A(9))	Q	0040
6.	IF (ARG-X(2)) 10,10,15	Q	0050
7.	10 MX = 1	Q	0060
8.	GO TO 40	Q	0070
9.	15 IF (X(N).LT.X(1).OR.ARG.LE,X(1)) GO TO 10	Q	0080
10.	IF (ARG-X(N-1)) 25,25,20	Q	0090
11.	20 MX = N-3	Q	0100
12.	GO TO 40	Q	0110
13.	25 K = N-1	Q	0120
14.	GO 35 JA=2,K	Q	0130
15.	IF (ARG-X(JA)) 30,30,35	Q	0140
16.	30 MX = JA-2	Q	0150
17.	GO TO 40	Q	0160
18.	35 CONTINUE	Q	0170
19.	40 XX = ARG	Q	0180
20.	DO 45 I=1,4	Q	0190
21.	MXI = MX+I-1	Q	0200
22.	45 A(I+1) = X(MXI)	Q	0210
23.	B1=((XX-X1)*(XX-X2)*(XX-X3))/(X0-X1)/(X0-X2)/(X0-X3)	Q	0220
24.	B2=((XX-X0)*(XX-X2)*(XX-X3))/(X1-X0)/(X1-X2)/(X1-X3)	Q	0230
25.	B3=((XX-X0)*(XX-X1)*(XX-X3))/(X2-X0)/(X2-X1)/(X2-X3)	Q	0240
26.	B4=((XX-X0)*(XX-X1)*(XX-X2))/(X3-X0)/(X3-X1)/(X3-X2)	Q	0250
27.	DO 55 L=1,LL	Q	0260
28.	DO 55 J=1,MM	Q	0270
29.	DO 50 I=1,4	Q	0280
30.	MXI = MX+I-1	Q	0290
31.	50 A(I+5) = Y(MXI,J,L)	Q	0300
32.	ANS = B1 * Y0 + B2 * Y1 + B3 * Y2 + B4 * Y3	Q	0310
33.	55 GIN (J,L) = ANS	Q	0320
34.	RETURN	Q	0330
35.	END	Q	0340

50.NOEP		19 OCT 76	12
1.	SUBROUTINE NOEPTS	N	0000
2.C*****		N	0010
3.C***	THIS SUBROUTINE IS TO FIND THE END POINTS - FOR RAKES NEAR HUB,	N	0020
4.C***	SHROUD AND/OR SPLITTERS	N	0030
5.C***	NOS = THE NUMBER OF END POINTS FOR EACH RAKE = 2*NO. OF SPLITTER	N	0040
6.C***	* 2 (HUB AND SHROUD)	N	0050
7.C***	NOEP = THE INDEX OF THE RAKE ENDPOINTS	N	0060
8.C*****		N	0070
9.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCHI	N	0080
10.	COMMON /NOUT/ IBEGIN(25),IEND(25),NOEP(50,6),NOS(25),NRAKES	N	0090
11.	COMMON /RDOUT/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBHX,NTMN	N	0100
12.	IN,NSPLT,YWING	N	0110
13.	J=1	N	0120
14.	IBEGIN(I)=1	N	0130
15.	NPMNH1=NPMIN-1	N	0140
16.	DO 15 I=1,NPMNH1	N	0150
17.	IF (ABS(XOFF(I+1)-XOFF(I)).GT..01) GO TO 10	N	0160
18.	GO TO 15	N	0170
19.	10 IEND(J)=I	N	0180
20.	J=J+1	N	0190
21.	IBEGIN(J)=I+1	N	0200
22.	15 CONTINUE	N	0210
23.	NRAKES=J	N	0220
24.	IEND(J)=NPMIN	N	0230
25.C*****		N	0240
26.C***	FIND THE END POINTS OF THE SPLITTER	N	0250
27.C*****		N	0260
28.	DO 30 I=1,NRAKES	N	0270
29.	IB=IBEGIN(I)	N	0280
30.	IE=IEND(I)	N	0290
31.	IEH1=IE-1	N	0300
32.	DYTEST=ABS(YOFF(IB)-YOFF(IB+1))	N	0310
33.C*****		N	0320
34.C***	NS IS THE COUNTER TO DETERMINE NUMBER OF END POINTS PER RAKE	N	0330
35.C***	NOEP IS THE END POINT INDEX	N	0340
36.C*****		N	0350
37.	NS=1	N	0360
38.	NOEP(I,1)=IB	N	0370
39.	IF (NSPLT.EQ.0) GO TO 25	N	0380
40.	DO 20 K=IB,IEH1	N	0390
41.	IF (ABS(ABS(YOFF(K+1)-YOFF(K))-DYTEST).LE.1.E-4) GO TO 20	N	0400
42.	NS=NS+1	N	0410
43.	NOEP(I,NS)=K	N	0420
44.	NS=NS+1	N	0430
45.	NOEP(I,NS)=K+1	N	0440
46.	DYTEST=ABS(YOFF(K+1)-YOFF(K+2))	N	0450
47.	20 CONTINUE	N	0460
48.	25 NS=NS+1	N	0470
49.	NOEP(I,NS)=IE	N	0480
50.	NOS(I)=NS	N	0490
51.	30 CONTINUE	N	0500
52.	RETURN	N	0510
53.	END	N	0520

50. OFBDY		19 OCT 76	12
1.	SUBROUTINE OFFBDY	L	0000
2.C		L	0010
3.C	SUBROUTINE TO CALCULATE ALL OFF-BODY VARIABLES	L	0020
4.C	CPCON CONTAINS MACH NO. (M) ON OUTPUT AS OF 6/12/74	L	0030
5.C		L	0040
6.	COMMON /MONOF/ JJS,JJ	L	0050
7.	COMMON /ONOUT/ VRESO(400),VP(400),BETAON(400)	L	0060
8.	COMMON /RCONT1/ VC,VINF,ALFAF,TOTAL,ELND,VA,PT	L	0070
9.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCL0,NCHI	L	0080
10.	COMMON/ROP/WDGTCR	L	0090
11.	COMMON /NOUT/ IBEGIN(25),IEND(25),NOEP(50,6),NOS(25),NRAKES	L	0100
12.	COMMON /RDOUT1/ XON(400),YON(400),NSPE(10),NSPB(10),XRT,NHURMX,NTML	L	0110
13.	IIN,NSPLT,YWING	L	0120
14.	COMMON /RDOUT4/ NTHETA,THETA(10),XTEST(10)	L	0130
15.	COMMON /GEARC/ YI	L	0140
16.	COMMON /COUT1/ QCA,PTC,PSPTC1,PT0180,ATOTAL,GRHO	L	0150
17.	COMMON /TOUT1/ SINTH,COSTH,OMEGA	L	0160
18.	COMMON /RCONT2/ PSTAT,TSTAT,WDOT,NX,KND,YRIHUB,YRISHR,UTIP	L	0170
19.	COMMON /VOUT1/ PSOPC(100),PHI(100),ZETA(100),VYI(100),CPC(100),VL	L	0180
20.	I2I(100),VMI(100),VAFT1(100),VSPANI(100),ETAI(100)	L	0190
21.	COMMON /VOUT2/ UI(100),VZPRI(100),BETAPI(100),VPRI(100),VZPRST(100)	L	0200
22.	I1,BETAPS(100),VPRST(100),MPRST(100),MPRI(100)	L	0210
23.	COMMON/BOO/DELO	L	0220
24.	COMMON/FORCE/ S(400),VAFT(200),VXC(200),VRESOF(200),VRES(100),	L	0230
25.	IVX(100),Y(100),X(100),NRI	L	0240
26.	DIMENSION BETA(100),VZPRST(100),ALFA(100)	L	0250
27.	1001	L	0260
28.	DIMENSION QLOC(300),IQSJ(50),Q(50),DEV1(50),QFRACY(300),YLOC(100)	L	0270
29.	13001	L	0280
30.	DIMENSION VBRFF(200),RRRTF(200),OSTOT(50,6)	L	0290
31.	DIMENSION VYC(200),VZC(200)	L	0300
32.	1 PSOPTC(200),MPRIME(200),MPRIST(200),ALFAOF(200)	L	0310
33.	2 BETAOF(200),VSPAN(200),ETA(200)	L	0320
34.	3 ZETA(200),PHI(200),VM(200),CPCOFF(200)	L	0330
35.	4 U(200),VZPRIM(200),BETAPRI(200),VPRIME(200)	L	0340
36.	5 VZPRS(200),BETPS(200),VPRIST(200)	L	0350
37.	DIMENSION PSOPT(400)	L	0360
38.	EQUIVALENCE (PSOPT(1),PSOPTC(1)),(PSOP(1),PSOPC(1))	L	0370
39.	REAL MPRIME,MPRIST,MPRST,MPRI	L	0380
40.	P1=3.14159265	L	0390
41.	Q14=1.0/1.4	L	0400
42.	GR044=GRHO/144.	L	0410
43.	NTEST=0	L	0420
44.	DO 40 I=1,NPMIN	L	0430
45.C		L	0440
46.C	READ FROM TAPE 3 VRESOF(1),VXC(1),VYC(1),VZC(1)	L	0450
47.C		L	0460
48.	READ (3) VRESOF(1),VXC(1),VYC(1),VZC(1)	L	0470
49.	VCONA=.2*(VRESOF(1)/ATOTAL)**2	L	0480
50.	IF (VCONA.LE.1.0) GO TO 15	L	0490
51.	PSOPTC(I)=0.0	L	0500
52.	MPRIME(I)=0.0	L	0510
53.	MPRIST(I)=0.0	L	0520
54.	10 FORMAT(1H,11HAT PT. NO. ,15,10H,VRESOF(=,E12.4,31H) IS GREATER TL	L	0530
55.	11HAN VMAX. VCONA=,E12.4)	L	0540
56.	WRITE (6,10)I,VRESOF(1),VCONA	L	0550

57.	GO TO 20	L	0560
58.	15 PSOPTC(I)=(1.0-VCONA)**3.5	L	0570
59.	20 ALFAOF(I)=ATAN2(VYC(I),VXC(I))/PI0180	L	0580
60.	BETAOF(I)=ARSTN(V7C(I)/VRESOF(I))/PI0180	L	0590
61.	VAFT(I)=VZC(I)*SINTH+VYC(I)*COSTH	L	0600
62.	VSPAN(I)=VYC(I)*SINTH-V7C(I)*COSTH	L	0610
63.	ETA(I)=ATAN2(VAFT(I),VXC(I))/PI0180	L	0620
64.	ZETA(I)=ATAN2(VSPAN(I),VXC(I))/PI0180	L	0630
65.	PHI(I)=ATAN2(VZC(I),VXC(I))/PI0180	L	0640
66.	VH(I)=SORT(VXC(I)**2+VYC(I)**2)	L	0650
67.	CPCOFF(I)=(PSOPTC(I)-PSPTC(I))/(QCA/PTC)	L	0660
68.	IF (VCONA.LT.1.) GO TO 25	L	0670
69.	CPCOFF(I)=9999.	L	0680
70.	GO TO 30	L	0690
71.	25 CPCOFF(I)=VRESOF(I)/ATOTAL/SORT(1.-VCONA)	L	0700
72.	30 CONTINUE	L	0710
73.C		L	0720
74.C	IF THE OFF-BODY X IS NOT AT CONTROL STATION, SKIP FOLLOWING CALCUL	L	0730
75.C		L	0740
76.	IF (XOFF(I).NE.XTEST(I)) GO TO 40	L	0750
77.	IF (NTEST.EQ.0) NTEST=1	L	0760
78.	U(I)=OMEGA*YOFF(I)	L	0770
79.	VZPRIM(I)=VZC(I)-U(I)	L	0780
80.	BETAPR(I)=ATAN2(VZPRIM(I),VH(I))	L	0790
81.	VPRIME(I)=VH(I)/COS(BETAPR(I))	L	0800
82.	BETAPR(I)=BETAPR(I)/PI0180	L	0810
83.	VCON=VPRIME(I)/ATOTAL	L	0820
84.	IF (VCONA.GT.1.0) GO TO 35	L	0830
85.	MPRIME(I)=VCON/((1.0-VCONA)**.5)	L	0840
86.	35 VZPRS(I)=-VZC(I)-U(I)	L	0850
87.	BETPS(I)=ATAN2(VZPRS(I),VH(I))	L	0860
88.	VPRIST(I)=VH(I)/COS(BETPS(I))	L	0870
89.	BETPS(I)=BETPS(I)/PI0180	L	0880
90.	VPCON=VPRIST(I)/ATOTAL	L	0890
91.	IF (VCONA.GT.1.0) GO TO 40	L	0900
92.	MPRIST(I)=VPCON/((1.0-VCONA)**.5)	L	0910
93.	40 CONTINUE	L	0920
94.	CALL NOEPTS	L	0930
95.C****		L	0940
96.C***	I = COUNT FOR INTERPOLATED OFF-BODY POINTS	L	0950
97.C***	IK LOOP FOR NUMBER OF RAKES	L	0960
98.C****		L	0970
99.	I=0	L	0980
100.	DO 95 IK=1,NRAKES	L	0990
101.	NOSI=NOS(IK)	L	1000
102.	IB=IBEGIN(IK)	L	1010
103.	IF (IB.EQ.NTEST) NTEST=IK	L	1020
104.C****		L	1030
105.C***	IS = STARTING POINT TO FIND ON-BODY X VALUE	L	1040
106.C***	ISP = STOPPING POINT TO FIND ON-BODY X VALUE	L	1050
107.C***	K = COUNT FOR NUMBER OF ENDPOINTS FOR RAKE	L	1060
108.C****		L	1070
109.	NS=0	L	1080
110.	DO 90 K=1,NOSI	L	1090
111.	IF (K.GT.1) GO TO 45	L	1100
112.	IS=1	L	1110
113.	ISP=NHUBMX	L	1120

114.	GO TO 70	L	1130
115.	45 IF (K.EQ.NOSI) GO TO 65	L	1140
116.	IF (MOD(K,2).EQ.0) GO TO 50	L	1150
117.	IS=NSPE(NS)	L	1160
118.	ISP=NSPB(NS+1)-1	L	1170
119.	IF (K.EQ.NOSI-1) ISP=NTMIN	L	1180
120.	GO TO 70	L	1190
121.	50 NS=NS+1	L	1200
122.	55 IS=NSPB(NS)	L	1210
123.	ISP=NSPE(NS)	L	1220
124.	IF (XOFF(IB).GT.XON(IS).OR.XOFF(IP).LT.XON(ISP)) GO TO 60	L	1230
125.	GO TO 70	L	1240
126.	60 NS=NS+1	L	1250
127.	GO TO 55	L	1260
128.	65 IS=NHUBMX+1	L	1270
129.	ISP=JJ	L	1280
130.C		L	1290
131.C	DO LOOP TO SEARCH FOR ON-BODY X VALUES NEAREST TO OFF-BODY X VALUE	L	1300
132.C		L	1310
133.	70 I=I+1	L	1320
134.	X(I)=XOFF(IB)	L	1330
135.	IFLAG=2	L	1340
136.	DO 85 J=IS,ISP	L	1350
137.	IF (MOD(K,2).EQ.0) GO TO 75	L	1360
138.C		L	1370
139.C	SEARCHING FORWARD - TOP-SIDE OF A BODY	L	1380
140.C		L	1390
141.	IF (X(I).LE.XON(IS)) GO TO 80	L	1400
142.	IF (XON(J).LT.X(I)) GO TO 85	L	1410
143.	CALL INTPOL (I,J,X(I),IFLAG,VX(I),VRES(I),BETA(I),ALFA(I))	L	1420
144.	PSOPC(I)=(1.0-.2*(VRES(I)/ATOTAL)**2)**3.5	L	1430
145.	Y(I)=YI	L	1440
146.	CALL VAROFF (I,BETA,ALFA,VX,VRES,X,Y)	L	1450
147.	GO TO 90	L	1460
148.C		L	1470
149.C	SEARCHING BACKWARD - UNDERSIDE OF A BODY	L	1480
150.C		L	1490
151.	75 IF (XON(J).GT.X(I)) GO TO 85	L	1500
152.	IND=J-1	L	1510
153.	CALL INTPOL (I,J,X(I),IFLAG,VX(I),VRES(I),BETA(I),ALFA(I))	L	1520
154.	PSOPC(I)=(1.0-.2*(VRES(I)/ATOTAL)**2)**3.5	L	1530
155.	Y(I)=YI	L	1540
156.	BETA(I)=-BETA(I)	L	1550
157.	VX(I)=-VX(I)	L	1560
158.	CALL VAROFF (I,BETA,ALFA,VX,VRES,X,Y)	L	1570
159.	GO TO 90	L	1580
160.	80 Y(I)=0.0	L	1590
161.	VX(I)=VXC(IB)	L	1600
162.	VRES(I)=VRESOF(IB)	L	1610
163.	BETA(I)=BETAOF(IB)	L	1620
164.	ALFA(I)=ALFAOF(IB)	L	1630
165.	PSOPC(I)=PSOPTC(IB)	L	1640
166.	CPC(I)=CPCOFF(IB)	L	1650
167.	GO TO 90	L	1660
168.	85 CONTINUE	L	1670
169.	90 CONTINUE	L	1680
170.	95 CONTINUE	L	1690


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171.C***** L 1700
172.C*** INTEGRATED WEIGHT FLOW BETWEEN LOWER BOUNDARY(EITHER INB OR AXIS) L 1710
173.C*** AND LOCAL Y VALUE L 1720
174.C*** NIO = NUMBER OF INTERPOLATED OFF BODY POINT L 1730
175.C***** L 1740
176. NIO=0 L 1750
177. IQS=0 L 1760
178. DO 125 J=1,NRAKES L 1770
179. IQS=IQS+1 L 1780
180. QLOC(IQS)=0.0 L 1790
181. NOSI=NOS(J) L 1800
182. QST=0.0 L 1810
183. DO 120 NS=1,NOSI,2 L 1820
184. NIO=NIO+1 L 1830
185. NLOW=NOEP(J,NS) L 1840
186. NH1=NOEP(J,NS+1) L 1850
187. NHIM1=NH1-1 L 1860
188. IQS=IQS+1 L 1870
189. QLOC(IQS)=PI*(PSOPTC(NLOW)**0.14*(YOFF(NLOW)*VXC(NLOW))+PSOPC(NIO)*L 1880
190. 1*0.14*(Y(NIO)*VX(NIO)))+(YOFF(NLOW)-Y(NIO))*QST L 1890
191. DO 100 I=NLOW,NHIM1 L 1900
192. IQS=IQS+1 L 1910
193. QLOC(IQS)=QLOC(IQS-1)+PI*(PSOPTC(I+1)**0.14*(YOFF(I+1)*VXC(I+1))+PSL L 1920
194. 1OPTC(I)**0.14*(YOFF(I)*VXC(I)))+(YOFF(I+1)-YOFF(I)) L 1930
195. 100 CONTINUE L 1940
196. NIO=NIO+1 L 1950
197. IQS=IQS+1 L 1960
198. IF (X(NIO).LT.XON(JJ)) GO TO 105 L 1970
199. QLOC(IQS)=QLOC(IQS-1)+PI*(PSOPC(NIO)**0.14*(Y(NIO)*VX(NIO))+PSOPTC(L 1980
200. 1NH1)**0.14*(YOFF(NH1)*VXC(NH1)))+(Y(NIO)-YOFF(NH1)) L 1990
201. QST=QLOC(IQS) L 2000
202. GO TO 110 L 2010
203. 105 QLOC(IQS)=QLOC(IQS-1) L 2020
204. QST=QLOC(IQS) L 2030
205. 110 IF (NS.EQ.NOSI-1) GO TO 115 L 2040
206. IQS=IQS+1 L 2050
207. QLOC(IQS)=QLOC(IQS-1) L 2060
208. 115 QSTOT(J,NS)=QST L 2070
209. 120 CONTINUE L 2080
210. IQSJ(J)=IQS-IQSAVF L 2090
211. IQSAVF=IQS L 2100
212. IF (J.EQ.1) IQSJ(J)=IQS L 2110
213. Q(J)=QST L 2120
214. 125 CONTINUE L 2130
215. DO 130 I=1,IQS L 2140
216. QLOC(I)=QLOC(I)*GR044 L 2150
217. 130 CONTINUE L 2160
218. SUM=0.0 L 2170
219. DO 135 I=1,NRAKES L 2180
220. Q(I)=Q(I)*GR044 L 2190
221. IF (IREGIN(I).NE.NCLO) GO TO 135 L 2200
222. QBAR=Q(I) L 2210
223. 135 CONTINUE L 2220
224. DO 140 I=1,NRAKES L 2230
225. DEVI(I)=(Q(I)-QBAR)/QBAR L 2240
226. 140 CONTINUE L 2250
227. IST=1 L 2260

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228.	IFN=IQSJ(1)	L	2270
229.	DO 150 I=1,NRAKES	L	2280
230.	QALL=Q(I)	L	2290
231.	JT=IBEGIN(I)	L	2300
232.	IF(XOFF(JT).LT.XOFF(JJ))QALL=Q(NTST)	L	2310
233.	DO 145 J=157,IFN	L	2320
234.	QFRACT(J)=QLOC(J)/QALL	L	2330
235.	145 CONTINUE	L	2340
236.	1ST=IFN+1	L	2350
237.	IFN=IFN+IQSJ(I+1)	L	2360
238.	150 CONTINUE	L	2370
239.C		L	2380
240.C	WRITE OFF-BODY DATA	L	2390
241.C		L	2400
242.	READ (2) (VBRFF(I),RBRFF(I),I=1,NPHIN)	L	2410
243.	WRITE (6,235)	L	2420
244.	NIO=0	L	2430
245.	DO 160 I=1,NRAKES	L	2440
246.	NOSI=NOS(I)	L	2450
247.	DO 160 NS=1,NOSI,2	L	2460
248.	NLOW=NOEP(I,NS)	L	2470
249.	NHI=NOEP(I,NS+1)	L	2480
250.	155 NIO=NIO+1	L	2490
251.	WRITE (6,240)X(NIO),Y(NIO),VX(NIO),VY(NIO),VZ(NIO),VRES(NIO),VHIL	L	2500
252.	1(NIO),VAFTI(NIO),VSPANI(NIO),PSOPC(NIO)	L	2510
253.	IF (MOD(NIO,2).EQ.0) GO TO 160	L	2520
254.	WRITE (6,245) (J,XOFF(J),YOFF(J),VXC(J),VYC(J),VZC(J),VRESOF(J),VHIL	L	2530
255.	1(J),VAFTI(J),VSPAN(J),RBRFF(J),PSOPTC(J),J=NLOW,NHI)	L	2540
256.	GO TO 155	L	2550
257.	160 CONTINUE	L	2560
258.	165 CONTINUE	L	2570
259.	WRITE (6,250)	L	2580
260.	NIO=0	L	2590
261.	NO=0	L	2600
262.	DO 185 I=1,NRAKES	L	2610
263.	NOSI=NOS(I)	L	2620
264.	DO 180 NS=1,NOSI,2	L	2630
265.	NLOW=NOEP(I,NS)	L	2640
266.	NHI=NOEP(I,NS+1)	L	2650
267.	170 NIO=NIO+1	L	2660
268.	NO=NQ+1	L	2670
269.	YLOC(NQ) = Y(NIO)	L	2680
270.	WRITE (6,255)X(NIO),Y(NIO),CPC(NIO),ALFA(NIO),BETA(NIO),ETA(NIO),L	L	2690
271.	1ZETA(NIO),PHI(NIO),QFRACT(NQ)	L	2700
272.	IF (MOD(NIO,2).EQ.0) GO TO 180	L	2710
273.	DO 175 J=NLOW,NHI	L	2720
274.	NQ=NQ+1	L	2730
275.	YLOC(NQ) = YOFF(J)	L	2740
276.	WRITE (6,260)J,XOFF(J),YOFF(J),VBRFF(J),CPCOFF(J),ALFAOF(J),BETAOF	L	2750
277.	1(J),ETA(J),ZETA(J),PHI(J),QFRACT(NQ)	L	2760
278.	175 CONTINUE	L	2770
279.	GO TO 170	L	2780
280.	180 CONTINUE	L	2790
281.	185 CONTINUE	L	2800
282.C		L	2810
283.C	WRITE OFF-BODY DATA AT THE CONTROL STATION	L	2820
284.C		L	2830

285.	WRITE (6,265)XTEST(1),UTIP	L	2840
286.	NIO=0	L	2850
287.	DO 205 I=1,NRAKES	L	2860
288.	NOSI=NOS(I)	L	2870
289.	DO 200 NS=1,NOSI,2	L	2880
290.	NLOW=NOEP(I,NS)	L	2890
291.	NHI=NOEP(1,NS+1)	L	2900
292.	190 NIO=NIO+1	L	2910
293.	IF (X(NIO).NE.XTEST(1)) GO TO 195	L	2920
294.	WRITE (6,270)Y(NIO),UT(NIO),VZPRI(NIO),VPRI(NIO),MPRI(NIO),BETAPI(L	L	2930
295.	INIO),VZPRST(INIO),VPRST(INIO),MPRST(INIO),BETAPS(INIO)	L	2940
296.	IF (MOD(NIO,2).EQ.0) GO TO 200	L	2950
297.	NPI=NIO	L	2960
298.	WRITE (6,270)(YOFF(J),U(J),VZPRIM(J),VPRIME(J),MPRIME(J),BETAPR(J)	L	2970
299.	1,VZPRS(J),VPRIST(J),MPRIST(J),BETPS(J),J=NLOW,NHI)	L	2980
300.	GO TO 190	L	2990
301.	195 NIO=NIO+1	L	3000
302.	200 CONTINUE	L	3010
303.	205 CONTINUE	L	3020
304.C		L	3030
305.C	WRITE WEIGHT FLOW DATA	L	3040
306.C		L	3050
307.	WRITE (6,285)	L	3060
308.	NIO=0	L	3070
309.	DO 230 I=1,NRAKES	L	3080
310.	NO. NOS(I)	L	3090
311.	DO 225 J=1,NOSI,2	L	3100
312.	NIO=NIO+2	L	3110
313.	OSTOT(I,J)=OSTOT(1,J)*GR044	L	3120
314.	OFR=OSTOT(I,J)/Q(I)	L	3130
315.	EM=99999.	L	3140
316.	QWALL=99999.	L	3150
317.	FLCOEF=99999.	L	3160
318.	WDOCRA=99999.	L	3170
319.	IF (X(NIO).LE.XON(JJ)) GO TO 215	L	3180
320.	ARAKE=PI/144.*(Y(NIO)*Y(NIO)-Y(NIO-1)*Y(NIO-1))	L	3190
321.	QWALL=GRHO*ARAKE*PSOPC(NIO)**0.14*VX(NIO)	L	3200
322.	FLCOEF=OSTOT(1,J)/QWALL	L	3210
323.	EM=0.	L	3220
324.	WDOCRA=OSTOT(1,J)*SQRT(TOTAL/518.67)/PTC*2116.22/ARAKE	L	3230
325.	210 EF=85.3842*(1.+2*EM*EM)**3.-WDOCRA	L	3240
326.	DFDM=85.3842*(1.+2*EM*EM)**3.*(1.-1.2*EM*EM/(1.+2*EM*EM))	L	3250
327.	EM=EM-CF/DFDM	L	3260
328.	IF (ABS(CF/DFDM)/(EM+EF/DFDM)).GE..01) GO TO 210	L	3270
329.	215 IF (J.GT.1) GO TO 220	L	3280
330.	IF (X(NIO).GT.XON(JJ)) WRITE (6,275)I,X(NIO),DEV1(I),OSTOT(I,J),QFL	L	3290
331.	2K,WDOCRA,EM,QWALL,FLCOEF	L	3300
332.	IF (X(NIO).LE.XON(JJ)) WRITE (6,275)I,X(NIO),DEV1(I),OSTOT(I,J),QFL	L	3310
333.	2R	L	3320
334.	GO TO 225	L	3330
335.	220 IF (X(NIO).GT.XON(JJ)) WRITE (6,280)OSTOT(I,J),OFR,WDOCRA,EM,QWALL	L	3340
336.	2,FLCOEF	L	3350
337.	IF (X(NIO).LE.XON(JJ)) WRITE (6,280)OSTOT(I,J),OFR	L	3360
338.	225 CONTINUE	L	3370
339.	230 CONTINUE	L	3380
340.	CALL STRML(YLOC,QFRACT,IOSJ,NRAKES,XOFF,NOEP)	L	3390
341.	IF (NX.EQ.-1) CALL OFFORC(PSOPTC,PSOPT)	L	3400

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342.      RETURN                                     L 3410
343.C*****                                     L 3420
344.C***      FORMATS                             L 3430
345.C*****                                     L 3440
346.C                                     L 3450
347. 235 FORMAT (1H1,5X,23H)OFF-BODY POINTS (RAKES)/ L 3460
348.      *      1HC,1CX,116HCOORDINATES      *-----L 3470
349. 1-----VELOCITIES-----*      PRESS,RL 3480
350. 2AT10/123H      AXIAL      RADIAL      AXIAL      RADIAL      CIRCUMFL 3490
351. 3XNTL RESULTANT MERIDIONAL      CHORDWISE      SPANWISE      COMPL 3500
352. 4/129H      I      X      Y      VX      VY      VZ L 3510
353. 5      VRES      VM      VAFY      VSPAN      RHOUR      PSOPL 3520
354. 6TC)                                     L 3530
355. 240 FORMAT (5X,1P9E12.4,7X,OPF8.4)         L 3540
356. 245 FORMAT (15,1P9E12.4,OPF7.4,OPF8.4)      L 3550
357. 250 FORMAT (//1H5,112H      COORDINATES      NEW CP L 3560
358. 1      *-----ANGLES-----*//1L 3570
359. 209H      AXIAL      RADIAL      MERIDIONAL 3580
360. 3L      FLOW      UNDERTURNING      SPANWISE      SWIRL/122H      I      X L 3590
361. 4      Y      VBR1      M      ALPHA      BETA L 3600
362. 5ETA      ZETA      PHI      OFRACT) L 3610
363. 255 FORMAT (5X,1P2E12.4,12X,1P7E12.4)      L 3620
364. 260 FORMAT (15,1P1E12.4) L 3630
365. 265 FORMAT (1HL 5X,25H)RELATIVE ROTOR INLET DATA/ L 3640
366.      *      1HD,1HH      X = ,F1D.4,17H      UTIP = ,F1D.4//12L 3650
367. 12H      Y      U      VZPRIME      VPRIM      MPRIME L 3660
368. 2      BETAPR      VZPRST      VPRST      MPRS      BETAPS) L 3670
369. 270 FORMAT (5X,1P1E12.4) L 3680
370. 275 FORMAT (18,2X,1PE11.4,5X,1PE11.4,6X,1PE11.4,2X,1PE11.4,4X,1PE11.4,L 3690
371. 44X,1PE11.4,2(3X,1PE11.4)) L 3700
372. 280 FORMAT (43X,1PE11.4,2X,1PE11.4,4X,1PE11.4,4X,1PE11.4,2(3X,1PE11.4))L 3710
373. 1) L 3720
374. 285 FORMAT (1HL,5X,21H)RAKE WEIGHT FLOW DATA/ L 3730
375.      *      1HC,92H      I      X      (Q(I)-QBAR)/QBAR      QS TOTL 3740
376. 1      OFR      QSTOTCR/ARAKE      MBAR L 3750
377. 234H      QWALL      QSTOT/QWALL ) L 3760
378.      END L 3770

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50.ONBDY		19 OCT 76	12
1.	SUBROUTINE ONBDY	I	0000
2.	C*****	I	0010
3.	C*** THIS SUBROUTINE CALCULATES ON-BODY VARIABLES	I	0020
4.	C*****	I	0030
5.	DIMENSION SPL0T(400,2),PPL0T(400,2),LAB(3)	I	0040
6.	DIMENSION PSOPT(400)	I	0050
7.	COMMON /WRT/ WSKIP,NT(2),NP(2)	I	0060
8.	COMMON /SLNND/SLND	I	0070
9.	COMMON /MONOF/ JJS,JJ	I	0080
10.	COMMON /RDOUT1/ XON(400),YON(400),NSPE(10),NSPB(10),XRI,NHUBMX,NTMI	I	0090
11.	11N,RSPLT,YWING	I	0100
12.	COMMON /COUT1/ QCA,PTC,PSPTC1,PIO180,ATOTAL,GRHO	I	0110
13.	COMMON /ONOUT/ VRES0N(400),VP(400),BETA0N(400)	I	0120
14.	COMMON /RCON:2/ PSTAT,ISTAT,WDOT,NX,KND,YRIHUB,YRISHR,UTIP	I	0130
15.	COMMON /RDOUT4/ NTHETA,THETA(10),YTEST(10),NANGLE,	I	0140
16.	1 TSWIRL,TSWIRL(400)	I	0150
17.	COMMON /RCON11/ VC,VINF,ALFAF,TTOTAL,ELND,VA,PT,CUTOFF	I	0160
18.	COMMON /FLAGS/IVORT,IGLOH,ISIG,ICURV,NONEWF,IDENT	I	0170
19.	COMMON/TITL/ TITL(9,6)	I	0180
20.	COMMON/RIC1/TITL(12)	I	0190
21.	DIMENSION VTH(400), PSOPTC(400), GPEON(400), VBAR(400), RBORT(400)	I	0200
22.	COMMON/FORCE/ S(400),VAF1(200),VXC(200),VRES0F(200),VRES(100),	I	0210
23.	1VX(100),Y(100),X(100),NRI	I	0220
24.	EQUIVALENCE (PSOPT(1),PSOPTC(1))	I	0230
25.	DATA SOSREF/'S/SREF'/	I	0240
26.	DATA THHETA/6HITHETA=	I	0250
27.	DATA ((TITL(15,16),15=1,9),16=1,2)	I	0260
28.	1 /6H ,6H NOR,6HMALIZE,6H SURF,6HACE DI,6HSTANCE,I	I	0270
29.	16H ON SH,6HROUD, ,6HS/SREF,6H ,6H ,6H PRESS, 6HSURE R,6HI	I	0280
30.	2AT10, , 6HPS/PTC,3*6H /	I	0290
31.	DATA LAB/6HTOWARD,6H FAN F,6HACE /,SSREFF/6HSREF= /	I	0300
32.	DO 10 IRTB=1,9	I	0310
33.	10 TITL(IRIB,5)=TITL(IRIB+2)	I	0320
34.	IPL0T1=999	I	0330
35.	ISW=1	I	0340
36.	IPL0T=C	I	0350
37.	IF(INTHETA.EQ.0) CUTOFF=D.	I	0360
38.	IF(INTHETA.NE.0)	I	0370
39.	1CALL SRTNE (XON,YON,XRI,YRIHUB,YRISHR,NHUBMX,NTMIN,S)	I	0380
40.	DO 55 I=1,NTMIN	I	0390
41.	C*****	I	0400
42.	C*** READ FROM TAPE 3 VRES0N , VP , VTH	I	0410
43.	C*****	I	0420
44.	READ (3) VRES0N(I),VP(I),VTH(I)	I	0430
45.	VCONC=.2*(VRES0N(I)/ATOTAL)**2.	I	0440
46.	IF (VCONC.GT.1.0) GO TO 15	I	0450
47.	PSOPTC(I)=(1.-VCONC)**3.5	I	0460
48.	GO TO 25	I	0470
49.	15 PSOPTC(I)=0.0	I	0480
50.	WRITE (6,20)I,VRES0N(I),VCONC	I	0490
51.	20 FORMAT(1H ,11HAT PT. NO. ,15,10H,VRES0N(= ,F12.4,31H) IS GREATER TI	I	0500
52.	1HAN VHAX. VCONC= ,F12.4)	I	0510
53.	25 IF (VTH(I).EQ.0.0) GO TO 30	I	0520
54.	BETA0N(I)=ATAN(VTH(I)/VP(I))/PIO180	I	0530
55.	GO TO 35	I	0540
56.	30 BETA0N(I)=0.0	I	0550

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57. 35 CPCON(I)=(PSOPTC(I)-PSPYCI)/(OCA/PTCY) I 0560
58. IF (VCONC.LT.1.) GO TO 40 I 0570
59. CPCON(I)=9999. I 0580
60. GO TO 55 I 0590
61. 40 CPCON(I)=VRESO(I)/ATOTAL/SQRT(1.-VCONC) I 0600
62. IF (CPCON(I).LT.1..OF.NX.NE.1) GO TO 55 I 0610
63. IF (CPCON(I-1).LT.1.) GO TO 45 I 0620
64. VSAVE=VRESO(I) I 0630
65. VRESO(I)=VRESO(I-1)+(VRESO(I)-VSAVE)*SQRT(1.+(1.-.25*(LMSAVE+CPCON(I-1))**2)) I 0640
66. ICON(I)**2)/(1.25*(LMSAVE+CPCON(I))**2)) I 0650
67. VSAVE=VRESO(I) I 0660
68. LMSAVE=CPCON(I) I 0670
69. VCONC=.2*(VRESO(I)/ATOTAL)**2 I 0680
70. PSOPTC(I)=(1.-VCONC)**3.5 I 0690
71. CPCON(I)=VRESO(I)/ATOTAL/SQRT(1.-VCONC) I 0700
72. GO TO 55 I 0710
73. 45 WRITE (6,50) I 0720
74. 50 FORMAT(49HCONBODY SUPERSONIC VELOCITY CORRECTION START, J= ,I4/) I 0730
75. VMAC1=ATOTAL/SQRT(1.2) I 0740
76. LMSAVE=CPCON(I) I 0750
77. VSAVE=VRESO(I) I 0760
78. VRESO(I)=VMAC1+(VRESO(I)-VMAC1)*SQRT(1.+(1.-.25*(CPCON(I)+1.)**2)) I 0770
79. I)/(1.25*(CPCON(I)+1.)**2)) I 0780
80. VCONC=.2*(VRESO(I)/ATOTAL)**2 I 0790
81. PSOPTC(I)=(1.-VCONC)**3.5 I 0800
82. CPCON(I)=VRESO(I)/ATOTAL/SQRT(1.-VCONC) I 0810
83. 55 IF (CPCON(I).LT.1..AND.CPCON(I-1).GE.1..AND.NX.EQ.1) WRITE (6,60) I 0820
84. 60 FORMAT(19HDO.S.V.C. STOP, I= ,I4/) I 0830
85. READ (2) (VBAR(I),RBOPT(I),I=1,NTMIN) I 0840
86.C***** I 0850
87.C*** WRITE HUB COORDINATES AND VARIABLES I 0860
88.C***** I 0870
89. WRITE (6,115) I 0880
90. IF (NHUBMX.EQ.0) GO TO 70 I 0890
91. WRITE (6,120) I 0900
92. DO 65 I=1,NHUBMX I 0910
93. XDUM=YON(I)/ELND I 0920
94. YDUM=YON(I)/ELND I 0930
95. SDUM=S(I)/SLND I 0940
96. WRITE (6,125) I,XDUM,YDUM,VP(I),VTH(I),VRESO(I),VBAR(I),PLTAON(I), I 0950
97. ISDUM,CPCON(I),RBOPT(I),PSOPTC(I) I 0960
98. 65 CONTINUE I 0970
99.C***** I 0980
100.C*** WRITE SHROUD COORDINATES AND VARIABLES I 0990
101.C***** I 1000
102. 70 WRITE (6,130) I 1010
103. WRITE (6,120) I 1020
104. NHUBP1=NHUBMX+1 I 1030
105. DO 90 I=NHUBP1,JJS I 1040
106. XDUM=YON(I)/ELND I 1050
107. YDUM=YON(I)/ELND I 1060
108. SDUM=S(I)/SLND I 1070
109. FANTOM=VBAR(I) I 1080
110. IF (NTHETA.EQ.0.AND.I.GE.1SWIRL) FANTOM=TSWIRL(I) I 1090
111. IF (NTHETA.EQ.0.AND.I.EQ.1SWIRL) WRITE (6,75) I 1100
112. 75 FORMAT(26H FOLLOWING 3-D STREAMLINE/68X,'-THETA-'/) I 1110
113. IF (CUTOFF.LE.0.) GO TO 85 I 1120

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114.      IF (S(I)*S(I-1).GE.0.) GO TO 80                      I 1130
115.      ISW=ISW+1                                           I 1140
116.      IPLOT1=IPLOT                                         I 1150
117.      IPLOT=0                                              I 1160
118.      80 STES1=ABS(SDUM)                                    I 1170
119.      IF (STES1.GT.(CUTOFF/SLND)) GO TO 85                I 1180
120.      IPLOT=IPLOT+1                                         I 1190
121.      SPLOT(IPLOT,ISW)=STES1                                I 1200
122.      PPLOT(IPLOT,ISW)=PSOPTC(I)                          I 1210
123.      85 WRITE (6,125)I,XDUM,YDUM,VP(I),VTH(I),VRLSON(I),FANTOM,BETAON(I),SI 1220
124.      IDUM,CPCON(I),RBORT(I),PSOPTC(I)                    I 1230
125.      90 CONTINUE                                           I 1240
126.      IF (CUTOFF.LE.0.) GO TO 95                           I 1250
127.      XLEN=IFIX(10.*CUTOFF/SLND)+1.                       I 1260
128.      CALL PLOXIS(XLEN,10.,.1,.1,0.,0.,.15,.1,0,0,5,2,1,1) I 1270
129.      CALL SYMBOL(XLEN-1.5,.5,.25,IDENT,0.,6)              I 1280
130.      CALL SYMBOL(XLEN-2.5,3.5,.25,TMTHETA,0.,6)           I 1290
131.      THE=THETA(ANGLE)*180./3.14157                       I 1300
132.      CALL NUMBER(XLEN-1.25,3.5,.25,THE,0.,0)              I 1310
133.      CALL SYMBOL(XLEN-3.5,2.6,.15,1,2.,-1)                I 1320
134.      FLG(0,6,I3)=3                                         I 1330
135.      CALL SYMBOL(XLEN-3.,2.5,.25,I3,0.,1)                 I 1340
136.      CALL SYMBOL(XLEN-2.7,2.5,.25,LAR,0.,18)              I 1350
137.      CALL SYMBOL(XLEN-2.5,1.5,.25,SSREFF,0.,6)            I 1360
138.      CALL NUMBER(XLEN-1.25,1.5,.25,SLND,0.,2)              I 1370
139.      CALL SYMBOL(XLEN/2.,.5,.15,SOSREF,0.,6)              I 1380
140.      IF (IPLOT1.EQ.999) IPLOT1=IPLOT                      I 1390
141.      CALL LINE(SPLOT(1,1),PPLOT(1,1),IPLOT1,1,1,1,0.,.1,0.,.1) I 1400
142.      CALL LINE(SPLOT(1,2),PPLOT(1,2),IPLOT,1,1,2,0.,.1,0.,.1) I 1410
143.      CALL PLOT(XLEN+1.,0.,-3)                             I 1420
144.C                                           I 1430
145.C      WRITE SPLITTER COORDINATES AND VARIABLES IF IT APPLIES I 1440
146.C                                           I 1450
147.      95 IF (NSPLT.EQ.0) GO TO 110                          I 1460
148.      DO 105 IN=1,NSPLT                                     I 1470
149.      NR=NSPB(IN)                                           I 1480
150.      NE=NSPB(IN+1)-1                                       I 1490
151.      IF (IN.EQ.NSPLT) NE=NTMIN                             I 1500
152.      WRITE (6,135)IN                                       I 1510
153.      WRITE (6,120)                                         I 1520
154.      DO 100 I=NR,NF                                         I 1530
155.      XDUM=XON(I)/ELND                                       I 1540
156.      YDUM=YON(I)/ELND                                       I 1550
157.      SQUM=S(I)/SLND                                         I 1560
158.      WRITE (6,125)I,XDUM,YDUM,VP(I),VTH(I),VRESON(I),VBAR(I),BETAON(I),I 1570
159.      IDUM,CPCON(I),RBORT(I),PSOPTC(I)                    I 1580
160.      100 CONTINUE                                           I 1590
161.      105 CONTINUE                                           I 1600
162.      110 CONTINUE                                           I 1610
163.      IF (NX.EQ.-1) CALL BEFORC(PSOPTC,PSOPT)              I 1620
164.      RETURN                                                 I 1630
165.C***** I 1640
166.C*** FORMATS I 1650
167.C***** I 1660
168.C I 1670
169.      115 FORMAT (1H0,10X,3HHR) I 1680
170.      120 FORMAT (11X,14HON-BODY POINTS//2X,1HI,6X,1HX,11X,1HY,11X,2HVP,9X,6I 1690

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171.	1HVTHETA,7X,4HVRES,7X,5HVBARI,7X,4HBCIA,1CX,1HS,11X,1HM,5X,5HRB/RI	1700
172.	2T,3X,6HPSOPTC)	I 1710
173.	125 FORMAT (I4,9E12.4,F7.4,F8.4)	I 1720
174.	130 FORMAT (1H0,1CX,6HSHROUD)	I 1730
175.	135 FORMAT (1H0,1CX,8HSPLITTER,13)	I 1740
176.	END	I 1750

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SO.ONANDOF

1. SUBROUTINE ONOFF
2. CALL ONBODY
3. CALL OFFBODY
4. RETURN
5. END

19 OCT 76 12

H 0000
H 0010
H 0020
H 0030
H 0040

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EODF-FAPREL*SORELZ(1),CSPLOX
      SUBROUTINE PLOXIS(XX,YY,EXEP,ORD,OFSETA,OFSETI,SLETRS,SNOSZ,K5,K6,KU
      ,L,NK,NLI)
      C
      C*****
      C***** SUBROUTINE ADDED TO DRAW AND LABEL AXIS FRAMES FOR ALL PLOTS *****
      COMMON/TITL/ TITL(9,61)
      UP = 1 - YY - 2 * SNOSZ
      M1=XX
      M2=YY
      CALL PLOT(4.,-11.,-3)
      CALL PLOT(0.,UP,-3)
      DO 25 I=1,M1
        X=I
        P=EXEP*X + OFSETA
        CALL PLOT(X,0.,2)
        CALL PLOT(X,.2,2)
        M=I/2
        B=FLOAT(I)-FLOAT(M)-X/2.
        IF (B) GO TO 25
      IF (K5) 15,15,20
      15 CALL NUMBER(X-SNOSZ,-SNOSZ-.10,SNOSZ,P,D.,NK)
      GO TO 25
      20 SN = 1.333*SNOSZ
      CALL NUMBER(X-SNOSZ-SNOSZ,-SN-SNOSZ-.10,SN,10.,D.,1)
      CALL NUMBER(99.D.-SNOSZ -.10,SNOSZ,P,D.,NK)
      25 CALL PLOT(X,0.,3)
      B = (XX-54.*SLETRS)/2.
      CALL SYMBOL(B,-SNOSZ-SLETRS-.30 ,SLETRS,TITL(1,K),D.,54)
      CALL PLOT(D.,0.,3)
      DO 45 J=1,M2
        Y=Y
        O=ORD*Y+OFSETI
        CALL PLOT(0.,Y,2)
        CALL PLOT(.2,Y,2)
        N=Y/2
        B=FLOAT(J)-FLOAT(N)-Y/2.
        IF (B) GO TO 45
      30 IF (K6) 35,35,40
      35 CALL NUMBER(-4.*SNOSZ -.15,Y,SNOSZ,O,D.,NL)
      GO TO 45
      40 SN = 1.333*SNOSZ
      CALL NUMBER(-.15 -SN-SN-SN ,Y-SNOSZ,SN,10.,O.,-1)
      CALL NUMBER(99.D.Y+SN-SNOSZ,SNOSZ,O,D.,NL)
      45 CALL PLOT(0.,Y,3)
      C = (YY-54.*SLETRS)/2.
      CALL SYMBOL(-SNOSZ-SNOSZ-SNOSZ-.15-.6,C,SLETRS,TITL(1,L),90.,54)
      CALL PLOT(0.,YY,3)
      CALL PLOT(XX,YY,2)
      CALL PLOT(XX,C.,2)
      DO 50 J=1,M2,2
        Y=Y
        IF (Y.EQ.YY) GO TO 55
      CALL PLOT(XX,Y,3)
      CALL PLOT(C.,Y,2)
      IF ((Y+.1).EQ.YY) GO TO 55
      CALL PLOT(0.,Y+.1,3)

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57	50	CALL PLOT(XX,Y+1.,2)	U	0560
58	55	CONTINUE	U	0570
59		DO 60 J=1,M1,2	U	0580
60		X=J	U	0590
61		IF (X.EQ.XX) GO TO 65	U	0600
62		CALL PLOT(XX-X,YY,3)	U	0610
63		CALL PLOT(XX-X,C.,2)	U	0620
64		IF ((XX-X-1.).EQ.0.) GO TO 65	U	0630
65		CALL PLOT(XX-X-1.,0.,3)	U	0640
66	60	CALL PLOT(XX-X-1.,YY,2)	U	0650
67	65	RETURN	U	0660
68		END	U	0670

ABRKPT PRINTS

57.	WRITE (6,166)ITITLE	B	0560
58.	READ (5,170) (NT(I),NP(I),I=1,2),NID,KSKIP,N4SOL,NSPLT	B	0570
59.	WRITE (6,171) (NT(I),NP(I),I=1,2),NID,KSKIP,N4SOL,NSPLT	B	0580
60.	NPMIN=NP(1)	B	0590
61.	NTMIN=NT(2)	B	0600
62.	IF (NSPLT.NE.0) READ (5,170) (NSPB(I),NSPC(I),I=1,NSPLT)	B	0610
63.	READ (5,175) VC,VINF,ALFAF,ITOTAL,ELND,YWING,UTIP,VA,PT,CUTOFF	B	0620
64.	WRITE (6,176) VC,VINF,ALFAF,ITOTAL,ELND,YWING,UTIP,VA,PT,CUTOFF	B	0630
65.	IF (ELND.EQ.0) ELND=1.	B	0640
66.	CUTOFF=ABS(CUTOFF)	B	0650
67.	READ (5,175) PSTAT,TSTAT,WDOT,DELO	B	0660
68.	WRITE (6,176) PSTAT,TSTAT,WDOT,DELO	B	0670
69.	READ (5,170) NTHETA,NCLO,NCHI,NX,KND,NOTHET,ICTLPT,ISWIRL	B	0680
70.	WRITE (6,171) NTHETA,NCLO,NCHI,NX,KND,NOTHET,ICTLPT,ISWIRL	B	0690
71.	IF (CUTOFF.GT.C..OR. (NTHETA+ICASE).EQ.0) CALL PLOTID	B	0700
72.	IF (NTHETA.EQ.0) NOTHET=1	B	0710
73.	READ (5,175) (THETA(I),I=1,NTHETA)	B	0720
74.	WRITE (6,176) (THETA(I),I=1,NTHETA)	B	0730
75.	READ (5,180) (XTEST(I),I=1,NX),YTESTH,YTESTS	B	0740
76.	WRITE (6,180) (XTEST(I),I=1,NX),YTESTH,YTESTS	B	0750
77.	READ (5,180) XRI,YRIHUB,YRISHR,NHUBMX	B	0760
78.	WRITE (6,181) XRI,YRIHUB,YRISHR,NHUBMX	B	0770
79.C****		B	0780
80.C***	IF KSKIP = 0 , READ DATA PUNCHED FROM EOD	B	0790
81.C****		B	0800
82.	IF (KSKIP.NE.0) GO TO 75	B	0810
83.	READ (7,10) IDENT,IVORT,IGEOM,ISIG,ICURV,NONEWF	B	0820
84.	10 FORMAT(A6,5I1)	B	0830
85.	IF (IVORT.EQ.1) NT(1)=NT(2)	B	0840
86.	IF (IVORT.EQ.1) NP(1)=NP(2)	B	0850
87.	DO 70 L=1,2	B	0860
88.	IF (IVORT+L.EQ.3) GO TO 70	B	0870
89.	IL00N=1+400*(L-1)	B	0880
90.	IHION=IL00N+NT(L)-1	B	0890
91.	NTL=NT(L)	B	0900
92.	IL0=1+200*(L-1)	B	0910
93.	IHI=IL0+NP(L)-1	B	0920
94.	NPL=NP(L)	B	0930
95.	IF (L.EQ.1) GO TO 20	B	0940
96.	READ (7,10) IDENT,IVORT,IGEOM,ISIG,ICURV,NONEWF	B	0950
97.C****		B	0960
98.C***	READ OUTPUT FROM EOD (BINARY RECORDS)	B	0970
99.C****		B	0980
100.	15 FORMAT(4E13.8)	B	0990
101.	20 READ (7,15) (XON(JK),JK=1,NTL)	B	1000
102.	READ (7,15) (YON(JK),JK=1,NTL)	B	1010
103.	READ (7,15) (TRD(JK),JK=IL00N,IHION)	B	1020
104.	NTLP4=NTL+400	B	1030
105.	IF (IVORT.EQ.1) READ (7,15) (TRD(JK),JK=401,NTLP4)	B	1040
106.	IF (NHUBMX*NSPLT.EQ.0) GO TO 25	B	1050
107.	IF (IVORT.EQ.1) READ (7,15) (TRD(JK),JK=401,NTLP4)	B	1060
108.	25 READ (7,15) (XOFF(JK),JK=1,NPL)	B	1070
109.	READ (7,15) (YOFF(JK),JK=1,NPL)	B	1080
110.	READ (7,15) (VXAXRD(JK),JK=IL0,IHI)	B	1090
111.	NPLP2=NPL+200	B	1100
112.	IF (IVORT.EQ.1) READ (7,15) (VXAXRD(JK),JK=201,NPLP2)	B	1110
113.	IF (NHUBMX*NSPLT.EQ.0) GO TO 30	B	1120

114.	IF (IVORT.EQ.1) READ (7,15) (VXAXRD(JK),JK=201,NPLP2)	B	1130
115.	30 READ (7,15) (VYAXRD(JK),JK=1LO,1HI)	B	1140
116.	IF (IVORT.EQ.1) READ (7,15) (VYAXRD(JK),JK=201,NPLP2)	B	1150
117.	IF (NHUPMX+NSPLT.CO.3) GO TO 35	B	1160
118.	IF (IVORT.EQ.1) READ (7,15) (VYAXRD(JK),JK=201,NPLP2)	B	1170
119.	35 IF (L.EQ.2) GO TO 40	B	1180
120.	READ (7,15) (V2(JK),JK=1LOON,1HI0N)	B	1190
121.	READ (7,15) (V2(JK),JK=1LOON,1HI0N)	B	1200
122.	READ (7,15) (VXCR(JK),JK=1LO,1HI)	B	1210
123.	READ (7,15) (VYCR(JK),JK=1LO,1HI)	B	1220
124.	READ (7,15) (V2CR(JK),JK=1LO,1HI)	B	1230
125.	GO TO 55	B	1240
126.	40 IF (INQSOL.EQ.2) GO TO 70	B	1250
127.	DO 45 I=1,4	B	1260
128.	READ (7,15) (ECDD(JK),JK=1,NTL)	B	1270
129.	45 CONTINUE	B	1280
130.	DO 50 I=1,5	B	1290
131.	READ (7,15) (ECDD(JK),JK=1,NPL)	B	1300
132.	50 CONTINUE	B	1310
133.	55 DO 60 I=1,NTL	B	1320
134.	XDUM(I)=XON(I)	B	1330
135.	60 YDUM(I)=YON(I)	B	1340
136.	DO 65 I=1,NPL	B	1350
137.	XAFF(I)=XOFF(I)	B	1360
138.	65 YAFF(I)=YOFF(I)	B	1370
139.	70 CONTINUE	B	1380
140.	75 WRITE (6,160) TITLE	B	1390
141.	IF (IVORT.EQ.1) NT(1)=NT(2)	B	1400
142.	WRITE (6,80) IDENT	B	1410
143.	80 FORMAT(1H,22HINLET GEOMETRY IDENT=,A6)	B	1420
144.	IF (IVORT.EQ.1) WRITE (6,85)	B	1430
145.	85 FORMAT(1H,10X,80HLINEAR COMBINATION OF THE FOLLOWING BASIC FLOWS	B	1440
146.	1 A: UNIFORM AXISYMMETRIC (DUCT OPEN)/64X,26HB. SYRIP VORTEX	B	1450
147.	2 ON SHROUD/64X,33HC. UNIFORM CROSSFLOW (DUCT OPEN)	B	1460
148.	IF (IVORT.EQ.2) WRITE (6,90)	B	1470
149.	90 FORMAT(1H,10X,91HLINEAR COMBINATION OF THE FOLLOWING BASIC FLOWS	B	1480
150.	1 A: UNIFORM AXISYMMETRIC (DUCT CLOSED)/64X,35HB. UNIFORM AX	B	1490
151.	2 ISYMMETRIC (DUCT OPEN)/64X,35HC. UNIFORM CROSSFLOW (DUCT CLOSED)	B	1500
152.	IF (IGEOM.EQ.0) WRITE (6,95) IGEOM	B	1510
153.	IF (IGEOM.NE.C) WRITE (6,100) IGEOM	B	1520
154.	IF (ISIG.EQ.0) WRITE (6,105) ISIG	B	1530
155.	IF (ISIG.EQ.1) WRITE (6,110) ISIG	B	1540
156.	IF (ISIG.EQ.2) WRITE (6,115) ISIG	B	1550
157.	IF (ICURV.EQ.0) WRITE (6,120) ICURV	B	1560
158.	IF (ICURV.NE.C) WRITE (6,125) ICURV	B	1570
159.	IF (NONEWF.EQ.0) WRITE (6,130)	B	1580
160.	IF (NONEWF.EQ.1) WRITE (6,135)	B	1590
161.	95 FORMAT(24HOCURVED ELEMENTS(IGEOMF=,I1,1H))	B	1600
162.	100 FORMAT(22HFLAT ELEMENTS(IGEOMF=,I1,1H))	B	1610
163.	105 FORMAT(1H+,30X,43HPIECEWISE-PARABOLIC SOURCE DENSITIES(ISIGF=,I1,	B	1620
164.	1 1H))	B	1630
165.	110 FORMAT(1H+,30X,40HPIECEWISE-LINEAR SOURCE DENSITIES(ISIGF=,I1,1H))	B	1640
166.	115 FORMAT(1H+,30X,42HPIECEWISE-CONSTANT SOURCE DENSITIES(ISIGF=,I1,	B	1650
167.	1 1H))	B	1660
168.	120 FORMAT(1H+,80X,46HINTERNALLY-COMPUTED ELEMENT CURVATURES(ICURVN=,	B	1670
169.	1 I1,1H))	B	1680
170.	125 FORMAT(1H+,80X,37HUSER-INPUT ELEMENT CURVATURES(ICURVN=,I1,1H))	B	1690

171.	130	FORMAT(32H NEW VELOCITY FORMULAE ARE USED.)	B	1700
172.	135	FORMAT(32H OLD VELOCITY FORMULAE ARE USED.)	B	1710
173.		IF(KND.EQ.0.OP.CUTOFF.GT.0.)SLND=ELND	B	1720
174.		IF(KND.LT.0.AND.KND.NE.0)SLND=1.	B	1730
175.		CALL CONST	B	1740
176.		IF (KND.GT.0) GO TO 155	B	1750
177.		DO 140 I=1,NMIN	B	1760
178.		XON(I)=YDUM(I)/ELND	B	1770
179.	140	YON(I)=YDUM(I)/ELND	B	1780
180.		DO 145 J=1,NPMIN	B	1790
181.		XOFF(J)=XAFF(J)/ELND	B	1800
182.	145	YOFF(J)=YAFF(J)/ELND	B	1810
183.		DO 150 I=1,NX	B	1820
184.	150	XTEST(I)=XTEST(I)/ELND	B	1830
185.		CUTOFF=CUTOFF/ELND	P	1840
186.	155	IF(KND.NE.0)ELND=1.	B	1850
187.		RETURN	B	1860
188.C			B	1870
189.C		FORMAT5	B	1880
190.C			B	1890
191.C			B	1900
192.	160	FORMAT (1H1,10X,3HCOMPRESSIBLE COMBYN APPROACH 5,10X,12A6)	B	1910
193.	165	FORMAT (12A6)	B	1920
194.	166	FORMAT(1H1,12A6)		
195.	170	FORMAT (2G14)	B	1930
196.	171	FORMAT(1H,2G14)		
197.	175	FORMAT (10F8.3)	B	1940
198.	176	FORMAT(1H,10F8.3)		
199.	180	FORMAT (3F10.2,14)	B	1950
200.	181	FORMAT(1H,3F10.4,14)		
201.	185	FORMAT (42X,3I2,16)	B	1960
202.	190	FORMAT (1HC/25H BASED ON BASIC DATA FROM,13,1H/,12,1H/,12,8H RUN NO	B	1970
203.		10.,16,4H AND,13,1H/,12,1H/,12,8H RUN NO.,16/)	B	1980
204.	195	IF (NTHETA.NE.0) GO TO 205	B	1990
205.		NCUT=(XON(I5WIRL)/2+1)*2	B	2000
206.		FANN=2.*NCUT	B	2010
207.		CALL PLOXIS(FANN,9.,1.,20.,-FANN/2.,C.,15.,1,0,0,3,4,1,-1)	B	2020
208.		CALL SYHDOL(FANN-1.5.,.5.,.25,IDENT,0.,6)	B	2030
209.		DO 200 IC=1,ICASE	B	2040
210.	200	CALL LINC(RCX(1,IC),RANG(1,IC),IPL0T(IC), 1,0,0,-FANN/2.,1.,C.,200	B	2050
211.		1.)	B	2060
212.		CALL PLOT(FANN+1.,0.,-3)	B	2070
213.	205	IF(CUTOFF.GT.C..OP.NTHETA.EQ.0) CALL PLOTID	B	2080
214.		STOP	B	2090
215.		END	B	2100

50.SINIPC		19 OCT 76	12
1.	SUBROUTINE SINIP (Z,W,N,X1,Y1)	S	0000
2.	DIMENSION X(200), Y(200), Z(1), W(1)	S	0010
3.	DO 10 I=1,N	S	0020
4.	X(I)=Z(I)	S	0030
5.	DO 10 Y(I)=W(I)	S	0040
6.	CALL SORTXY (X,Y,N)	S	0050
7.	C	S	0060
8.	DO 15 I=1,N	S	0070
9.	K=1	S	0080
10.	IF (X1.GT.X(I)) GO TO 15	S	0090
11.	IF (X1.EQ.X(I)) GO TO 20	S	0100
12.	IF (X1.LT.X(I)) GO TO 25	S	0110
13.	15 CONTINUE	S	0120
14.	20 Y1=Y(K)	S	0130
15.	GO TO 30	S	0140
16.	25 IF (K.EQ.1) GO TO 35	S	0150
17.	IF (K.EQ.N) K=N-1	S	0160
18.	IF (X(K).EQ.X(K+1)) K=K-1	S	0170
19.	W1=(X1-X(K))*(X1-X(K+1))/(X(K)-X(K+1))/(X(K-1)-X(K))/(X(K-1)-X(K+1))	S	0180
20.	W2=(X1-X(K-1))*(X1-X(K+1))/(X(K)-X(K-1))/(X(K)-X(K+1))	S	0190
21.	W3=(X1-X(K-1))*(X1-X(K))/(X(K+1)-X(K-1))/(X(K+1)-X(K))	S	0200
22.	Y1=Y(K-1)*W1+Y(K)*W2+Y(K+1)*W3	S	0210
23.	30 RETURN	S	0220
24.	35 Y1=D.C	S	0230
25.	RETURN	S	0240
26.	END	S	0250

50.SORTXC		19 OCT 76 12	
1.	SUBROUTINE SORTXY(X,Y,NPTS)	T	0000
2.	DIMENSION X(100),Y(100)	T	0010
3.	10 N=NPTS	T	0020
4.	15 NN=N-1	T	0030
5.	20 DO 55 KY=1,NN	T	0040
6.	XMIN=X(KY)	T	0050
7.	JAD=KY	T	0060
8.	JKL=KY+1	T	0070
9.	25 DO 45 JK=JKL,N	T	0080
10.	30 IF (XMIN-X(JK)) 45,45,35	T	0090
11.	35 XMIN=X(JK)	T	0100
12.	40 JAD=JK	T	0110
13.	45 CONTINUE	T	0120
14.	50 YMIN=Y(JAD)	T	0130
15.	X(JAD)=X(KY)	T	0140
16.	Y(JAD)=Y(KY)	T	0150
17.	X(KY)=XMIN	T	0160
18.	Y(KY)=YMIN	T	0170
19.	55 CONTINUE	T	0180
20.	RETURN	T	0190
21.	END	T	0200

50.SS08		19 OCT 76 12	
1.	SUBROUTINE SRINC (XON,YON,XRI,YRISHR,NHUBMX,NTHIN,S)	J	0000
2.	DIMENSION XON(1), YON(1), S(1)	J	0010
3.	COMMON /MONOF/ JJS,JJ	J	0020
4.C		J	0030
5.C	S ROUTINE	J	0040
6.C		J	0050
7.	IF (NHUBMX.LE.0) GO TO 35	J	0060
8.	XHB=XRI	J	0070
9.	ISI=0	J	0080
10.	IF (XON(1).GT.XHB) GO TO 15	J	0090
11.	10 ISI=ISI+1	J	0100
12.	IF (XON(ISI)-XHB) 15,20,25	J	0110
13.	15 XHB=XON(1)-(XON(2)-XON(1))/(YON(2)-YON(1))*(YON(1)	J	0120
14.	11-YRISHR)	J	0130
15.	ISI=1	J	0140
16.	20 S(ISI)=SORT((YON(ISI)-XHB)**2+(YON(ISI)-YRISHR)**2)	J	0150
17.	ISI=ISI+1	J	0160
18.	DO 25 I=ISI,NHUBMX	J	0170
19.	S(I)=S(I-1)+SORT((XON(I)-XON(I-1))**2+(YON(I)-YON(I-1))**2)	J	0180
20.	25 CONTINUE	J	0190
21.	IS2=ISI-1	J	0200
22.	S(IS2)=SORT((XON(IS2)-XHB)**2+(YON(IS2)-YRISHR)**2)	J	0210
23.	IS3=ISI-2	J	0220
24.	DO 30 I=I,IS3	J	0230
25.	IS3=IS2-I	J	0240
26.	S(IS3)=S(IS3+1)+SORT((XON(IS3)-XON(IS3+1))**2+(YON(IS3)-YON(IS3+1))	J	0250
27.	1)**2)	J	0260
28.	30 CONTINUE	J	0270
29.	35 ISI=NHUBMX	J	0280
30.	40 ISI=ISI+1	J	0290
31.	IF (ISI.GT.(JJ+6)) GO TO 45	J	0300
32.	IF (XON(ISI)-XRI) 50,50,40	J	0310
33.	45 ISI=JJ	J	0320
34.	IF (YON(JJ).LT.YRISHR) ISI=ISI+1	J	0330
35.	50 S(ISI)=SORT((XON(ISI)-XRI)**2+(YON(ISI)-YRISHR)**2)	J	0340
36.	ISI=ISI+1	J	0350
37.	DO 55 I=ISI,NTHIN	J	0360
38.	S(I)=S(I-1)+SORT((XON(I)-XON(I-1))**2+(YON(I)-YON(I-1))**2)	J	0370
39.	55 CONTINUE	J	0380
40.	IS2=ISI-1	J	0390
41.	S(IS2)=SORT((XON(IS2)-XRI)**2+(YON(IS2)-YRISHR)**2)	J	0400
42.	ISMIN=NHUBMX+1	J	0410
43.	IS3=ISI-2	J	0420
44.	DO 60 I=ISMIN,IS3	J	0430
45.	IS3=IS2-I+NHUBMX	J	0440
46.	S(IS3)=S(IS3+1)+SORT((XON(IS3)-XON(IS3+1))**2+(YON(IS3)-YON(IS3+1))	J	0450
47.	1)**2)	J	0460
48.	60 CONTINUE	J	0470
49.C		J	0480
50.C	END OF S	J	0490
51.C		J	0500
52.	RETURN	J	0510
53.	END	J	0520

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SO.STREMLN		19 OCT 76	12
1.	SUBROUTINE STRML(Y,D,IO,NRAKES ,X,N)	0	0000
2.	COMMON/BOO/DELO	0	0010
3.	DIMENSION Y(1), Q(1), IO(1), X(1), N(1,1)	0	0020
4.C		0	0030
5.C	THIS SUBROUTINE CALCULATES STREAMLINES	0	0040
6.C		0	0050
7.	WRITE (6,35)	0	0060
8.	IF(DELO.EQ.C)DELO=.1	0	0070
9.	IST=1	0	0080
10.	IFN=IO(1)	0	0090
11.	DO 30 I=1,NRAKES	0	0100
12.	NO=N(1,1)	0	0110
13.	QSTRM=DELO	0	0120
14.	WRITE (6,40)X(NO)	0	0130
15.	10 L=IST	0	0140
16.	15 IF (L.GE,IFN) GO TO 25	0	0150
17.	IF (.NOT.((QSTRM.GE.Q(L).AND.QSTRM.LE.Q(L+1)).OR.(QSTRM.LE.Q(L).AND	0	0160
18.	10.QSTRM.GE.Q(L+1)))) GO TO 20	0	0170
19.	YSTRM=Y(L)+ (Y(L+1)-Y(L))*(QSTRM-Q(L))/(Q(L+1)-Q(L))	0	0180
20.	WRITE (6,45)QSTRM,YSTRM	0	0190
21.	20 L=L+1	0	0200
22.	GO TO 15	0	0210
23.	25 QSTRM=QSTRM+DELO	0	0220
24.	IF (QSTRM.LE.1.0) GO TO 10	0	0230
25.	IST=IFN+1	0	0240
26.	IFN=IFN+IO(1+1)	0	0250
27.	30 CONTINUE	0	0260
28.	RETURN	0	0270
29.C		0	0280
30.	35 FORMAT (1H0,10X,11HSTREAMLINES/)	0	0290
31.	40 FORMAT (1H0,10X,4HX = ,F7.3/10X,5HQSTRM,10X,5HYSTRM)	0	0300
32.	45 FORMAT (5X,1PE12.5,6X,1PE12.5)	0	0310
33.	END	0	0320

50. TRAPS		19 OCT 76	12
1.	SUBROUTINE TRAP(X,Y,ANS,II)	R	0000
2.	DIMENSION X(50),Y(50)	R	0010
3.	SUM = 0	R	0020
4.	DO 10 I=2,II	R	0030
5.	ADD= .5*(Y(I)+Y(I-1))*(X(I)-X(I-1))	R	0040
6.	SUM=SUM+ADD	R	0050
7.	10 CONTINUE	R	0060
8.	15 FORMAT(1X,2E14.8)	R	0070
9.	ANS = SUM	R	0080
10.	RETURN	R	0090
11.	END	R	0100

50.VAROT		19 OCT 76	12
1.	SUBROUTINE VAROFF (I,BETA,ALFA,VX,VRES,X,Y)	M	0000
2.	DIMENSION BETA(I),ALFA(I),VX(I),VRES(I),X(I),Y(I)	M	0010
3.	COMMON /TOUT1/ SINTH,COSTH,OMEGA	M	0020
4.	COMMON /NIN/ XOFF(200),YOFF(200),NPMIN,NCLO,NCHI	M	0030
5.	COMMON /COUT1/ QCA,PTC,PSPTC1,PIO180,ATOTAL,GRHO	M	0040
6.	COMMON /VOUT1/ PSOPC(100),PHI(100),ZETA(100),VYI(100),CPC(100),VM	M	0050
7.	12I(100),VMI(100),VAFTI(100),VSPANI(100),ETAI(100)	M	0060
8.	COMMON /VOUT2/ UI(100),VZPRI(100),BETAPI(100),VPRI(100),VZPRST(100)	M	0070
9.	11,BETAPS(100),VPRST(100),MPRST(100),MPRI(100)	M	0080
10.	REAL MPRST,MPRI	M	0090
11.	VCAN=.2*(VRES(I)/ATOTAL)**2	M	0100
12.	IF (VCAN.LE.1.0) GO TO 10	M	0110
13.	PSOPC(I)=0.0	M	0120
14.	MPRI(I)=0.0	M	0130
15.	MPRST(I)=0.0	M	0140
16.	GO TO 15	M	0150
17.	10 PSOPC(I)=(1.0-VCAN)**3.5	M	0160
18.	15 VYI(I)=VX(I)*TAN(ALFA(I)*PIO180)	M	0170
19.	CPC(I)=SQRT(5.*(1./PSOPC(I)**(1./3.5)-1.))	M	0180
20.	VZI(I)=VRES(I)*SIN(BETA(I)*PIO180)	M	0190
21.	VMI(I)=SQRT(VX(I)**2+VYI(I)**2)	M	0200
22.	VAFTI(I)=VZI(I)*SINTH+VYI(I)*COSTH	M	0210
23.	VSPANI(I)=VYI(I)*SINTH-VZI(I)*COSTH	M	0220
24.	ETAI(I)=ATAN2(VAFTI(I),VX(I))/PIO180	M	0230
25.	ZETA(I)=ATAN2(VSPANI(I),VX(I))/PIO180	M	0240
26.	PHI(I)=ATAN2(VZI(I),VX(I))/PIO180	M	0250
27.C		M	0260
28.C	IF X IS NOT AT THE CONTROL STATION SKIP FOLLOWING CALCULATIONS	M	0270
29.C		M	0280
30.	IF (X(I).NE.XOFF(NCLO)) RETURN	M	0290
31.	UI(I)=OMEGA*Y(I)	M	0300
32.	VZPRI(I)=VZI(I)-UI(I)	M	0310
33.	BETAPI(I)=ATAN2(VZPRI(I),VMI(I))	M	0320
34.	VPRI(I)=VMI(I)/COS(BETAPI(I))	M	0330
35.	BETAPI(I)=BETAPI(I)/PIO180	M	0340
36.	IF (VCAN.GT.1.0) GO TO 20	M	0350
37.	VCON=VPRI(I)/ATOTAL	M	0360
38.	MPRI(I)=VCON/((1.0-VCAN)**.5)	M	0370
39.	20 VZPRST(I)=-VZI(I)-UI(I)	M	0380
40.	BETAPS(I)=ATAN2(VZPRST(I),VMI(I))	M	0390
41.	VPRST(I)=VMI(I)/COS(BETAPS(I))	M	0400
42.	BETAPS(I)=BETAPS(I)/PIO180	M	0410
43.	IF (VCAN.GT.1.0) RETURN	M	0420
44.	VPCON=VPRST(I)/ATOTAL	M	0430
45.	MPRST(I)=VPCON/((1.0-VCAN)**.5)	M	0440
46.	RETURN	M	0450
47.	END	M	0460

50.VBART		19 OCT 76	12
1.	SUBROUTINE VBART (VBAR,ATOTAL,RHOTOT,RHOBAR)	0	0030
2.C	APPROACH 5	0	0010
3.C		0	0020
4.C		0	0030
5.C	TO SOLVE VBAR COMP ITERATIVELY	0	0040
6.C		0	0050
7.	VCRIT=ATOTAL/SQRT(1.2)	0	0060
8.	Y=0	0	0070
9.	VGUES=VBAR	0	0080
10.	10 VGUESA=(VGUES/ATOTAL)**2	0	0090
11.	A=1.0-.2*VGUESA	0	0100
12.	B=A-VGUESA	0	0110
13.	VCOMP=(VBAR-A**2.5*VGUES)/(A**1.5*B)+VGUES	0	0120
14.	IF (ABS(VCOMP-VGUES)/VCOMP).LT..0001) GO TO 15	0	0130
15.	I=I+1	0	0140
16.	IF (VCOMP.GE.VCRIT) VCOMP=.5*(VGUES+VCRIT)	0	0150
17.	VGUES=VCOMP	0	0160
18.	IF (I.GT.20) GO TO 15	0	0170
19.	GO TO 10	0	0180
20.	15 RHOBAR=(1.5-.2*(VCOMP/ATOTAL)**2)**2.5*RHOTOT	0	0190
21.	IF (I.GT.20) WRITE 16,20 VBAR,VCOMP,RHOBAR	0	0200
22.	IF (I.GT.20) VBAR=VCOMP*RHOBAR/RHOTOT	0	0210
23.	RETURN	0	0220
24.C		0	0230
25.	20 FORMAT (1H3,34H1 EXCEEDS 20 ITERATIONS FOR RHOBAR,5X,7HVBAR = ,1PED	0	0240
26.	11C.3,2X,8HVCOMP = ,1PE10.3,2X,9HRHOBAR = ,1PE10.3/	0	0250
27.	270H VBAR HAS BEEN REDUCED TO VCOMP*RHOBAR/RHOTOT,WHERE VCOMP=VCRIT	0	0260
28.	3ICAL	0	0270
29.	END	0	0280

INPUT AND OUTPUT FOR TEST CASE

Program SCIRCL
(a) Printed Output:

GEOMETRY ONLY, SCIRCL RELEASE 2-0

DATE 053177

INPUT FILE DUMP

TEST CASE RELEASE 2.0

12.00 0.0 1.00 7.00 0.00 1.00

BFQCI EOD 1 1

2.00 .250 1.00 11.5 0.00

9

-0.5 0.0 6.5 10

0.0 0.0 5.5 10

0.5 0.0 0.0 10

1.0 0.0 0.0 10

1.500 0.0 0.0 10

1.698 0.0 0.0 10

2.698 0.0 0.0 10

3.698 0.0 0.0 10

11.600 0.0 0.0 10

1.0 2.0

0.0 2.0 2.0

8.011 8.011

-1.00 0.0

1.00

11.611 36.00

2.400 2.400

2.0 6.0

1.0

36.00 11.611

6.00 6.00

-3.00

12.611 11.611 1.698

6.00 6.00 4.991

1000.00 2.0 2.0

3.00 1.698

4.991 4.991

1000.

0.00 0.00 .258

4.000 5.840 6.119

1.0

2.581 11.611

6.453 6.453

1.00

11.611 36.00

6.453 6.453

GEOMETRY ONLY, SCIRCLE RELEASE 2-0

DATE 051177

CASE BFQCI TEST CASE RELEASE 2.0

FLAG INPUT, 1ST RECORD - FOREDD, 2ND - PUNCH, PLOT, REDO FLAG5

0000 0
BFQCI EOD 011 1 0 0 000 0 0

NO. OF BODIES = 2, DELS = .250 DELSMX = 1.000 KRI = 11.600000

**** HUB *****
ENREED = .00

EXPONENTS		SUPERELLIPSE					
P = 2.000	X	8.0110+00	8.0110+00	0.0000	0.0000	1.1611+01	3.6000+01
Q = 2.000	Y	-1.3300+00	0.0000	0.0000	0.0000	2.4000+00	2.4000+00

P = .20000000+01 A = .24000000+01 XD = .70110000+01
Q = .24000000+01 B = .35999999+01 YD = .25999999+01 OMEGA = .00000000

3 ITERATIONS---
DELS IN = .25000 DELS = .25509 DELS OUT = .25509 DSTEST = .24595

LAST POINT K= 21, X= .11611+02, Y= .24000+01, KAPPA= -.18519+00, DY/DX= .00000, ALPHA= .00000

ENREED		STRAIGHT LINE	
1.000	X	1.1611+01	3.6000+01
	Y	2.4000+00	2.4000+00

LAST POINT K= 49, X= .36000+02, Y= .24000+01, KAPPA= .00000, DY/DX= .00000, ALPHA= .00000

**** SHROUD *****

ENREED		STRAIGHT LINE	
1.000	X	3.6000+01	1.1611+01
	Y	6.3300+00	6.0000+00

LAST POINT K= 78, X= .11611+02, Y= .60000+01, KAPPA= .00000, DY/DX= .00000, ALPHA= .00000

ENREED		CUBIC			
3.000	X	1.2611+01	1.1611+01	1.6980+00	5.0000+01
	Y	6.0000+00	6.0000+00	4.9910+00	4.9910+00

2 ITERATIONS A = -2.07160-03 B = 4.13564-02 C = -1.22528-01 D = 5.38996+00
DELS IN = .25509 DELS = .25525 DELS OUT = .25525 DSTEST = .25194

LAST POINT K= 119, X= .16980+01, Y= .49910+01, KAPPA= .61605-01, DY/DX= .12951-04, ALPHA= .74204-03
ENREED = 1000.00

EXPONENTS		SUPERELLIPSE					
P = 2.000	X	3.0000+00	1.6980+00	0.0000	0.0000	0.0000	0.0000
Q = 2.000	Y	4.9910+00	4.9910+00	0.0000	0.0000	5.6400+00	7.0000+00

P = .20000000+01 A = .16980000+01 XD = .16980000+01
Q = .20000000+01 B = .84899998+00 YD = .58400000+01 OMEGA = .00000000

8 ITERATIONS---
DELS IN = .25525 DELS = .18050 DELS OUT = .07170 DSTEST = .06552 FINAL PACE= .05000

GEOMETRY ONLY, SCIRCLE RELEASE 2-D

DATE 053177

LAST POINT K= 137, X= .00000 , Y= .58400+01, KAPPA= -.23557+01, DY/DX= -.99999+05, ALPHA= -.89999+02
ENREED= 1000.00

EXPONENTS

SUPERELLIPSE

P = .000 X 0.0000 0.0000 2.5800-01 7.7400-01 2.5810+00 4.0000+00
Q = .000 Y 4.0000+00 5.8400+00 6.1190+00 6.2770+00 6.4530+00 6.4530+00

P = .22586403+01 A = .61300004+00 X0 = -.18400000+01
Q = .17577100+01 B = .25810000+01 Y0 = .65810000+01 OMEGA = .00000000

8 ITERATIONS---

DELS IN = .07170 DELS = .07170 DELS OUT = .25525 DSTEST = .00177 FINAL PACE= .05157

LAST POINT K= 160, X= .25810+01, Y= .64530+01, KAPPA= -.31705+00, DY/DX= .00000 , ALPHA= .00000

ENREED

STRAIGHT LINE

1.000 X 2.5810+00 1.1611+01
Y 6.4530+00 6.4530+00

LAST POINT K= 195, X= .11611+02, Y= .64530+01, KAPPA= .00000 , DY/DX= .00000 , ALPHA= .00000

ENREED

STRAIGHT LINE

1.000 X 1.1611+01 3.6003+01
Y 6.4530+00 6.4530+00

LAST POINT K= 223, X= .36000+02, Y= .64530+01, KAPPA= .00000 , DY/DX= .00000 , ALPHA= .00000

INPUT FOR THE COMBINE PROGRAM NT(1)= 226 NT(2)= 221 NHISNIX= 48 NP= 90

BODY I	CO-ORDINATES - X	Y	KAPPA	DY/DX	ALPHA	S	S-S(2)	DELTAS
1	.80110+01	.00000	-.62500+00	.99900+03	.90000+02	.00000	-.47472+01	.00000
2	.80275+01	.22962+00	-.61442+00	.69360+01	.81796+02	.23022+00	-.45170+01	.23022+00
3	.80769+01	.45723+00	-.58476+00	.34355+01	.73771+02	.46309+00	-.42841+01	.23208+00
4	.81559+01	.67395+00	-.54280+00	.22785+01	.66304+02	.69377+00	-.40534+01	.23068+00
5	.82518+01	.88020+00	-.49504+00	.16911+01	.59403+02	.92566+00	-.38216+01	.23189+00
6	.83917+01	.10741+01	-.44701+00	.13321+01	.53105+02	.11590+01	-.35882+01	.23335+00
7	.85420+01	.12546+01	-.40221+00	.10872+01	.47392+02	.13939+01	-.33533+01	.23492+00
8	.87099+01	.14211+01	-.36235+00	.90730+00	.42217+02	.16304+01	-.31168+01	.23646+00
9	.88866+01	.15688+01	-.32893+00	.77183+00	.37662+02	.18607+01	-.28865+01	.23027+00
10	.90765+01	.17044+01	-.30021+00	.66091+00	.33461+02	.20940+01	-.26532+01	.23332+00
11	.92776+01	.18276+01	-.27590+00	.56746+00	.29573+02	.23298+01	-.24174+01	.23582+00
12	.94881+01	.19383+01	-.25553+00	.48677+00	.25956+02	.25677+01	-.21795+01	.23787+00
13	.97065+01	.20367+01	-.23861+00	.41560+00	.22568+02	.28072+01	-.19400+01	.23956+00
14	.99315+01	.21228+01	-.22468+00	.35162+00	.19373+02	.30482+01	-.16990+01	.24095+00
15	.10162+02	.21970+01	-.21333+00	.29312+00	.16337+02	.32903+01	-.14569+01	.24211+00
16	.10397+02	.22594+01	-.20423+00	.23882+00	.13432+02	.35334+01	-.12139+01	.24306+00
17	.10635+02	.23102+01	-.19712+00	.18768+00	.10630+02	.37772+01	-.97000+00	.24345+00
18	.10877+02	.23496+01	-.19180+00	.13889+00	.79072+01	.40217+01	-.72549+00	.24451+00
19	.11120+02	.23776+01	-.18809+00	.91746+01	.52420+01	.42668+01	-.48044+00	.24505+00
20	.11365+02	.23944+01	-.18591+00	.45640+01	.26132+01	.45123+01	-.23494+00	.24549+00
21	.11611+02	.24000+01	.00000	.00000	.00000	.47582+01	.11002+01	.24595+00
22	.11866+02	.24000+01	.00000	.00000	.00000	.50133+01	.26609+00	.25509+00
23	.12272+02	.24000+01	.00000	.00000	.00000	.53194+01	.57220+00	.30611+00
24	.12540+02	.24000+01	.00000	.00000	.00000	.56868+01	.93954+00	.36733+00
25	.12980+02	.24000+01	.00000	.00000	.00000	.61276+01	.13803+01	.44080+00

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26	.13509+02	.24000+01	.00000	.00000	.00000	.66565+01	.19093+01	.52896+00
27	.14144+02	.24000+01	.00000	.00000	.00000	.72913+01	.25440+01	.63475+00
28	.14906+02	.24000+01	.00000	.00000	.00000	.80539+01	.33057+01	.76170+00
29	.15820+02	.24000+01	.00000	.00000	.00000	.89670+01	.42198+01	.91404+00
30	.16829+02	.24000+01	.00000	.00000	.00000	.99760+01	.52288+01	.10090+01
31	.17838+02	.24000+01	.00000	.00000	.00000	.10985+02	.62378+01	.10090+01
32	.18847+02	.24000+01	.00000	.00000	.00000	.11994+02	.72468+01	.10090+01
33	.19856+02	.24000+01	.00000	.00000	.00000	.13003+02	.82558+01	.10090+01
34	.20865+02	.24000+01	.00000	.00000	.00000	.14012+02	.92648+01	.10090+01
35	.21874+02	.24000+01	.00000	.00000	.00000	.15021+02	.10274+02	.10090+01
36	.22883+02	.24000+01	.00000	.00000	.00000	.16030+02	.11283+02	.10090+01
37	.23892+02	.24000+01	.00000	.00000	.00000	.17039+02	.12292+02	.10090+01
38	.24901+02	.24000+01	.00000	.00000	.00000	.18048+02	.13301+02	.10090+01
39	.25910+02	.24000+01	.00000	.00000	.00000	.19057+02	.14310+02	.10090+01
40	.26919+02	.24000+01	.00000	.00000	.00000	.20066+02	.15319+02	.10090+01
41	.27928+02	.24000+01	.00000	.00000	.00000	.21075+02	.16328+02	.10090+01
42	.28937+02	.24000+01	.00000	.00000	.00000	.22084+02	.17337+02	.10090+01
43	.29946+02	.24000+01	.00000	.00000	.00000	.23093+02	.18346+02	.10090+01
44	.30955+02	.24000+01	.00000	.00000	.00000	.24102+02	.19355+02	.10090+01
45	.31964+02	.24000+01	.00000	.00000	.00000	.25111+02	.20364+02	.10090+01
46	.32973+02	.24000+01	.00000	.00000	.00000	.26120+02	.21373+02	.10090+01
47	.33982+02	.24000+01	.00000	.00000	.00000	.27129+02	.22382+02	.10090+01
48	.34991+02	.24000+01	.00000	.00000	.00000	.28138+02	.23391+02	.10090+01
49	.36000+02	.24000+01	.00000	.00000	.00000	.29147+02	.24400+02	.10090+01

BODY 2 CO-ORDINATES - X	Y	KAPPA	DI/DX	ALPHA	S	S*(2)-S	DELTA S
50	.36000+02	.60000+01	.00000	.00000	.00000	.24400+02	.00000
51	.34991+02	.60000+01	.00000	.00000	.10090+01	.23391+02	.10090+01
52	.33982+02	.60000+01	.00000	.00000	.20180+01	.22382+02	.10090+01
53	.32973+02	.60000+01	.00000	.00000	.30270+01	.21373+02	.10090+01
54	.31964+02	.60000+01	.00000	.00000	.40360+01	.20364+02	.10090+01
55	.30955+02	.60000+01	.00000	.00000	.50451+01	.19355+02	.10090+01
56	.29946+02	.60000+01	.00000	.00000	.60541+01	.18346+02	.10090+01
57	.28937+02	.60000+01	.00000	.00000	.70631+01	.17337+02	.10090+01
58	.27928+02	.60000+01	.00000	.00000	.80721+01	.16328+02	.10090+01
59	.26919+02	.60000+01	.00000	.00000	.90811+01	.15319+02	.10090+01
60	.25910+02	.60000+01	.00000	.00000	.10090+02	.14310+02	.10090+01
61	.24901+02	.60000+01	.00000	.00000	.11099+02	.13301+02	.10090+01
62	.23892+02	.60000+01	.00000	.00000	.12108+02	.12292+02	.10090+01
63	.22883+02	.60000+01	.00000	.00000	.13117+02	.11283+02	.10090+01
64	.21874+02	.60000+01	.00000	.00000	.14126+02	.10274+02	.10090+01
65	.20865+02	.60000+01	.00000	.00000	.15135+02	.92648+01	.10090+01
66	.19856+02	.60000+01	.00000	.00000	.16144+02	.82558+01	.10090+01
67	.18847+02	.60000+01	.00000	.00000	.17153+02	.72468+01	.10090+01
68	.17838+02	.60000+01	.00000	.00000	.18162+02	.62378+01	.10090+01
69	.16829+02	.60000+01	.00000	.00000	.19171+02	.52288+01	.10090+01
70	.15820+02	.60000+01	.00000	.00000	.20180+02	.42198+01	.10090+01
71	.14906+02	.60000+01	.00000	.00000	.21094+02	.33057+01	.91404+00
72	.14144+02	.60000+01	.00000	.00000	.21856+02	.25440+01	.76170+00
73	.13509+02	.60000+01	.00000	.00000	.22491+02	.19093+01	.63475+00
74	.12980+02	.60000+01	.00000	.00000	.23020+02	.13803+01	.52896+00
75	.12540+02	.60000+01	.00000	.00000	.23460+02	.93953+00	.44080+00
76	.12172+02	.60000+01	.00000	.00000	.23828+02	.57220+00	.36733+00
77	.11866+02	.60000+01	.00000	.00000	.24134+02	.26659+00	.30611+00
78	.11611+02	.60000+01	-.61607-01	-.74506-08	.24389+02	.10999-01	.25509+00
79	.11359+02	.59981+01	-.58453-01	-.15139-01	.24641+02	-.24115+00	.25215+00

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80	.11108+02	.59925+01	-.55289-01	.29391-01	.16835+01	.24892+02	-.49162+00	.25047+00
81	.10860+02	.59835+01	-.52125-01	.42782-01	.24497+01	.25181+02	-.74061+00	.24899+00
82	.10612+02	.59713+01	-.48968-01	.55331-01	.31670+01	.25388+02	-.98829+00	.24768+00
83	.10366+02	.59563+01	-.45825-01	.67060-01	.38365+01	.25635+02	-.12348+01	.24652+00
84	.10121+02	.59385+01	-.42701-01	.77983-01	.44591+01	.25880+02	-.14803+01	.24550+00
85	.98776+01	.59182+01	-.39599-01	.88118-01	.50358+01	.26125+02	-.17249+01	.24460+00
86	.96348+01	.58957+01	-.36522-01	.97477-01	.55674+01	.26369+02	-.19687+01	.24382+00
87	.93929+01	.58711+01	-.33471-01	.10607+00	.60549+01	.26612+02	-.22119+01	.24313+00
88	.91518+01	.58445+01	-.30446-01	.11392+00	.64990+01	.26854+02	-.24544+01	.24254+00
89	.89115+01	.58163+01	-.27448-01	.12102+00	.69004+01	.27096+02	-.26944+01	.24203+00
90	.86717+01	.57865+01	-.24475-01	.12739+00	.72598+01	.27338+02	-.29380+01	.24160+00
91	.84325+01	.57553+01	-.21526-01	.13303+00	.75777+01	.27579+02	-.31793+01	.24124+00
92	.81937+01	.57229+01	-.18598-01	.13795+00	.78546+01	.27820+02	-.34202+01	.24095+00
93	.79553+01	.56895+01	-.15691-01	.14216+00	.80911+01	.28061+02	-.36609+01	.24072+00
94	.77172+01	.56553+01	-.12800-01	.14566+00	.82874+01	.28301+02	-.39015+01	.24054+00
95	.74794+01	.56203+01	-.99231-02	.14845+00	.84439+01	.28542+02	-.41419+01	.24042+00
96	.72417+01	.55847+01	-.70571-02	.15054+00	.85608+01	.28782+02	-.43822+01	.24035+00
97	.70040+01	.55488+01	-.41985-02	.15192+00	.86383+01	.29023+02	-.46226+01	.24033+00
98	.67664+01	.55126+01	-.13439-02	.15260+00	.86764+01	.29263+02	-.48629+01	.24036+00
99	.65287+01	.54763+01	.15101-02	.15258+00	.86753+01	.29503+02	-.51034+01	.24044+00
100	.62911+01	.54401+01	.43656-02	.15186+00	.86344+01	.29744+02	-.53438+01	.24042+00
101	.60534+01	.54042+01	.72243-02	.15043+00	.85550+01	.29984+02	-.55841+01	.24032+00
102	.58158+01	.53687+01	.10090-01	.14831+00	.84359+01	.30224+02	-.58244+01	.24027+00
103	.55781+01	.53337+01	.12966-01	.14548+00	.82772+01	.30465+02	-.60646+01	.24027+00
104	.53402+01	.52995+01	.15854-01	.14194+00	.80788+01	.30705+02	-.63050+01	.24032+00
105	.51021+01	.52662+01	.18759-01	.13770+00	.78404+01	.30945+02	-.65454+01	.24042+00
106	.48637+01	.52343+01	.21683-01	.13275+00	.75617+01	.31186+02	-.67860+01	.24058+00
107	.46249+01	.52029+01	.24628-01	.12708+00	.72422+01	.31427+02	-.70268+01	.24080+00
108	.43857+01	.51733+01	.27595-01	.12069+00	.68816+01	.31668+02	-.72678+01	.24108+00
109	.41459+01	.51452+01	.30547-01	.11357+00	.64792+01	.31909+02	-.75093+01	.24143+00
110	.39055+01	.51188+01	.33604-01	.10571+00	.60345+01	.32151+02	-.77511+01	.24185+00
111	.36644+01	.50944+01	.36647-01	.97112-01	.55467+01	.32393+02	-.79935+01	.24236+00
112	.34225+01	.50720+01	.39713-01	.87758-01	.50153+01	.32636+02	-.82364+01	.24295+00
113	.31796+01	.50519+01	.42803-01	.77637-01	.44394+01	.32880+02	-.84801+01	.24364+00
114	.29359+01	.50343+01	.45914-01	.66738-01	.38181+01	.33124+02	-.87245+01	.24443+00
115	.26910+01	.50193+01	.49042-01	.55046-01	.31507+01	.33370+02	-.89698+01	.24534+00
116	.24449+01	.50073+01	.52182-01	.42546-01	.24363+01	.33616+02	-.92162+01	.24638+00
117	.21975+01	.49984+01	.55328-01	.29221-01	.16738+01	.33864+02	-.94638+01	.24756+00
118	.19486+01	.49929+01	.58472-01	.15050-01	.86226+00	.34113+02	-.97127+01	.24891+00
119	.16980+01	.49910+01	.29446+00	.00000	.00000	.34363+02	-.99633+01	.25044+00
120	.15265+01	.49953+01	.29787+00	-.50751-01	-.29053+01	.34535+02	-.10135+02	.17153+00
121	.13638+01	.50076+01	.30778+00	-.10036+00	-.57310+01	.34698+02	-.10298+02	.16315+00
122	.12099+01	.50268+01	.32413+00	-.15107+00	-.85349+01	.34853+02	-.10453+02	.15518+00
123	.10645+01	.50523+01	.34783+00	-.20107+00	-.11369+02	.35001+02	-.10601+02	.14760+00
124	.92755+00	.50834+01	.37870+00	-.25458+00	-.14283+02	.35141+02	-.10741+02	.14042+00
125	.79897+00	.51198+01	.41956+00	-.31206+00	-.17331+02	.35275+02	-.10875+02	.13362+00
126	.67865+00	.51610+01	.47240+00	-.37532+00	-.20572+02	.35402+02	-.11002+02	.12720+00
127	.56654+00	.52069+01	.54057+00	-.44683+00	-.24076+02	.35523+02	-.11123+02	.12116+00
128	.46268+00	.52575+01	.62879+00	-.53018+00	-.27932+02	.35639+02	-.11239+02	.11551+00
129	.36912+00	.53115+01	.74075+00	-.62859+00	-.32153+02	.35747+02	-.11347+02	.10802+00
130	.28454+00	.53695+01	.88463+00	-.75110+00	-.36910+02	.35849+02	-.11449+02	.10258+00
131	.20945+00	.54315+01	.10680+01	-.91104+00	-.42135+02	.35947+02	-.11547+02	.97373-01
132	.14455+00	.54972+01	.12965+01	-.11330+01	-.48567+02	.36039+02	-.11639+02	.92303-01
133	.92773-01	.55632+01	.15553+01	-.14499+01	-.55405+02	.36123+02	-.11723+02	.83442-01
134	.51724-01	.56320+01	.18378+01	-.19791+01	-.63194+02	.36203+02	-.11803+02	.80146-01
135	.22269-01	.57030+01	.21042+01	-.30568+01	-.71885+02	.36280+02	-.11880+02	.76778-01
136	.50333-02	.57747+01	.22943+01	-.64793+01	-.81226+02	.36354+02	-.11954+02	.73770-01

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137	.00000	.58400+01	.00000	.99900+03	.90000+02	.36419+02	-.12019+02	.65516-01
138	.10247-01	.59080+01	-.53794+01	.29337+01	.71178+02	.36488+02	-.12088+02	.64766-01
139	.40365-01	.59645+01	-.39704+01	.13577+01	.53627+02	.36552+02	-.12152+02	.64052-01
140	.81239-01	.60093+01	-.26050+01	.91132+00	.42344+02	.36612+02	-.12212+02	.60602-01
141	.12412+00	.60436+01	-.18144+01	.71279+00	.35481+02	.36667+02	-.12267+02	.54945-01
142	.17501+00	.60763+01	-.12827+01	.58181+00	.30191+02	.36728+02	-.12328+02	.60467-01
143	.23321+00	.61072+01	-.93113+00	.48911+00	.26064+02	.36794+02	-.12394+02	.65926-01
144	.29837+00	.61367+01	-.69505+00	.41972+00	.22769+02	.36865+02	-.12465+02	.71519-01
145	.37084+00	.61649+01	-.53242+00	.36543+00	.20074+02	.36943+02	-.12543+02	.77378-01
146	.44952+00	.61920+01	-.41734+00	.32141+00	.17818+02	.37026+02	-.12626+02	.83590-01
147	.53588+00	.62181+01	-.33385+00	.28467+00	.15890+02	.37117+02	-.12717+02	.90218-01
148	.62987+00	.62433+01	-.27193+00	.25325+00	.14212+02	.37214+02	-.12814+02	.97318-01
149	.73194+00	.62677+01	-.22516+00	.22582+00	.12725+02	.37319+02	-.12919+02	.10494+00
150	.84258+00	.62913+01	-.18931+00	.20142+00	.11388+02	.37432+02	-.13032+02	.11313+00
151	.96238+00	.63141+01	-.16151+00	.17935+00	.10168+02	.37554+02	-.13154+02	.12194+00
152	.10920+01	.63360+01	-.13981+00	.15906+00	.90380+01	.37685+02	-.13285+02	.13142+00
153	.12320+01	.63569+01	-.12257+00	.14011+00	.79759+01	.37827+02	-.13427+02	.14163+00
154	.13834+01	.63767+01	-.10976+00	.12211+00	.69620+01	.37980+02	-.13580+02	.15262+00
155	.15468+01	.63952+01	-.99911-01	.10470+00	.59771+01	.38144+02	-.13744+02	.16446+00
156	.17232+01	.64121+01	-.93056-01	.87495-01	.50004+01	.38321+02	-.13921+02	.17721+00
157	.19136+01	.64271+01	-.89356-01	.70031-01	.48059+01	.38512+02	-.14112+02	.19094+00
158	.21189+01	.64396+01	-.89869-01	.51616-01	.29547+01	.38718+02	-.14318+02	.20574+00
159	.23404+01	.64488+01	-.99090-01	.30883-01	.17689+01	.38940+02	-.14540+02	.22168+00
160	.25810+01	.64530+01	.00000	.00000	.00000	.39180+02	-.14780+02	.24063+00
161	.28390+01	.64530+01	.00000	.00000	.00000	.39438+02	-.15038+02	.25800+00
162	.30970+01	.64530+01	.00000	.00000	.00000	.39696+02	-.15296+02	.25800+00
163	.33550+01	.64530+01	.00000	.00000	.00000	.39954+02	-.15554+02	.25800+00
164	.36130+01	.64530+01	.00000	.00000	.00000	.40212+02	-.15812+02	.25800+00
165	.38710+01	.64530+01	.00000	.00000	.00000	.40470+02	-.16070+02	.25800+00
166	.41290+01	.64530+01	.00000	.00000	.00000	.40728+02	-.16328+02	.25800+00
167	.43870+01	.64530+01	.00000	.00000	.00000	.40986+02	-.16586+02	.25800+00
168	.46450+01	.64530+01	.00000	.00000	.00000	.41244+02	-.16844+02	.25800+00
169	.49030+01	.64530+01	.00000	.00000	.00000	.41502+02	-.17102+02	.25800+00
170	.51610+01	.64530+01	.00000	.00000	.00000	.41760+02	-.17360+02	.25800+00
171	.54190+01	.64530+01	.00000	.00000	.00000	.42018+02	-.17618+02	.25800+00
172	.56770+01	.64530+01	.00000	.00000	.00000	.42276+02	-.17876+02	.25800+00
173	.59350+01	.64530+01	.00000	.00000	.00000	.42534+02	-.18134+02	.25800+00
174	.61930+01	.64530+01	.00000	.00000	.00000	.42792+02	-.18392+02	.25800+00
175	.64510+01	.64530+01	.00000	.00000	.00000	.43050+02	-.18650+02	.25800+00
176	.67090+01	.64530+01	.00000	.00000	.00000	.43308+02	-.18908+02	.25800+00
177	.69670+01	.64530+01	.00000	.00000	.00000	.43566+02	-.19166+02	.25800+00
178	.72250+01	.64530+01	.00000	.00000	.00000	.43824+02	-.19424+02	.25800+00
179	.74830+01	.64530+01	.00000	.00000	.00000	.44082+02	-.19682+02	.25800+00
180	.77410+01	.64530+01	.00000	.00000	.00000	.44340+02	-.19940+02	.25800+00
181	.79990+01	.64530+01	.00000	.00000	.00000	.44598+02	-.20198+02	.25800+00
182	.82570+01	.64530+01	.00000	.00000	.00000	.44856+02	-.20456+02	.25800+00
183	.85150+01	.64530+01	.00000	.00000	.00000	.45114+02	-.20714+02	.25800+00
184	.87730+01	.64530+01	.00000	.00000	.00000	.45372+02	-.20972+02	.25800+00
185	.90310+01	.64530+01	.00000	.00000	.00000	.45630+02	-.21230+02	.25800+00
186	.92890+01	.64530+01	.00000	.00000	.00000	.45888+02	-.21488+02	.25800+00
187	.95470+01	.64530+01	.00000	.00000	.00000	.46146+02	-.21746+02	.25800+00
188	.98050+01	.64530+01	.00000	.00000	.00000	.46404+02	-.22004+02	.25800+00
189	.10063+02	.64530+01	.00000	.00000	.00000	.46662+02	-.22262+02	.25800+00
190	.10321+02	.64530+01	.00000	.00000	.00000	.46920+02	-.22520+02	.25800+00
191	.10579+02	.64530+01	.00000	.00000	.00000	.47178+02	-.22778+02	.25800+00
192	.10837+02	.64530+01	.00000	.00000	.00000	.47436+02	-.23036+02	.25800+00
193	.11095+02	.64530+01	.00000	.00000	.00000	.47694+02	-.23294+02	.25800+00

GEOMETRY ONLY, SCIRCLE RELEASE 2-0						DATE 053177		
194	.11353+02	.64530+01	.00000	.00000	.00000	.47952+02	-.23552+02	.25800+00
195	.11611+02	.64530+01	.00000	.00000	.00000	.48210+02	-.23813+02	.25800+00
196	.11869+02	.64530+01	.00000	.00000	.00000	.48468+02	-.24068+02	.25800+00
197	.12179+02	.64530+01	.00000	.00000	.00000	.48778+02	-.24378+02	.30960+00
198	.12550+02	.64530+01	.00000	.00000	.00000	.49149+02	-.24749+02	.37152+00
199	.12996+02	.64530+01	.00000	.00000	.00000	.49595+02	-.25195+02	.44582+00
200	.13531+02	.64530+01	.00000	.00000	.00000	.50130+02	-.25730+02	.53499+00
201	.14173+02	.64530+01	.00000	.00000	.00000	.50772+02	-.26372+02	.64199+00
202	.14943+02	.64530+01	.00000	.00000	.00000	.51543+02	-.27143+02	.77038+00
203	.15868+02	.64530+01	.00000	.00000	.00000	.52467+02	-.28067+02	.92446+00
204	.16874+02	.64530+01	.00000	.00000	.00000	.53474+02	-.29074+02	.10066+01
205	.17881+02	.64530+01	.00000	.00000	.00000	.54480+02	-.30080+02	.10066+01
206	.18888+02	.64530+01	.00000	.00000	.00000	.55487+02	-.31087+02	.10066+01
207	.19894+02	.64530+01	.00000	.00000	.00000	.56493+02	-.32093+02	.10066+01
208	.20901+02	.64530+01	.00000	.00000	.00000	.57500+02	-.33100+02	.10066+01
209	.21907+02	.64530+01	.00000	.00000	.00000	.58507+02	-.34107+02	.10066+01
210	.22914+02	.64530+01	.00000	.00000	.00000	.59513+02	-.35113+02	.10066+01
211	.23921+02	.64530+01	.00000	.00000	.00000	.60520+02	-.36120+02	.10066+01
212	.24927+02	.64530+01	.00000	.00000	.00000	.61526+02	-.37126+02	.10066+01
213	.25934+02	.64530+01	.00000	.00000	.00000	.62533+02	-.38133+02	.10066+01
214	.26940+02	.64530+01	.00000	.00000	.00000	.63540+02	-.39140+02	.10066+01
215	.27947+02	.64530+01	.00000	.00000	.00000	.64546+02	-.40146+02	.10066+01
216	.28954+02	.64530+01	.00000	.00000	.00000	.65553+02	-.41153+02	.10066+01
217	.29960+02	.64530+01	.00000	.00000	.00000	.66560+02	-.42160+02	.10066+01
218	.30967+02	.64530+01	.00000	.00000	.00000	.67566+02	-.43166+02	.10066+01
219	.31974+02	.64530+01	.00000	.00000	.00000	.68573+02	-.44173+02	.10066+01
220	.32980+02	.64530+01	.00000	.00000	.00000	.69579+02	-.45179+02	.10066+01
221	.33987+02	.64530+01	.00000	.00000	.00000	.70586+02	-.46186+02	.10066+01
222	.34993+02	.64530+01	.00000	.00000	.00000	.71593+02	-.47193+02	.10066+01
223	.36000+02	.64530+01	.00000	.00000	.00000	.72599+02	-.48199+02	.10066+01
BODY 3 CO-ORDINATES - X Y								
224	.36000+02	.24000+01						
225	.36000+02	.31200+01						
226	.36000+02	.38400+01						
227	.36000+02	.45600+01						
228	.36000+02	.52800+01						
229	.36000+02	.60000+01						
XRAK YLO WHI NDY								
-.50000+00	.00000	.65000+01						10
.00000	.00000	.55000+01						10
.50000+00	.00000	.51229+01						10
.10000+01	.00000	.49257+01						10
.15000+01	.00000	.48336+01						10
.16980+01	.00000	.48195+01						10
.26980+01	.00000	.47744+01						10
.36980+01	.00000	.48553+01						10
.11600+02	.26458+01	.57478+01						10

GEOMETRY ONLY, SCIRCLE RELEASE 2-0

DATE 053177

I	XOM	YOM	YOMH	AREA	DISC AREA	ENSUBK
50	3.6000+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
51	3.4991+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
52	3.3982+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
53	3.2973+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
54	3.1964+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
55	3.0955+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
56	2.9946+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
57	2.8937+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
58	2.7928+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
59	2.6919+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
60	2.5910+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
61	2.4901+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
62	2.3892+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
63	2.2883+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
64	2.1874+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
65	2.0865+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
66	1.9856+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
67	1.8847+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000

GEOMETRY ONLY, SCIRCLE RELEASE 2-D					DATE 053177	
68	1.7838+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
69	1.6829+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
70	1.5820+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
71	1.4906+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
72	1.4144+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
73	1.3509+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
74	1.2980+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
75	1.2540+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
76	1.2172+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
77	1.1866+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	0.0000
78	1.1611+01	6.0000+00	2.4000+00	9.5002+01	1.1310+02	-1.8744-01
79	1.1359+01	5.9981+00	2.3941+00	9.5018+01	1.1302+02	-1.7810-01
80	1.1108+01	5.9925+00	2.3765+00	9.5071+01	1.1281+02	-1.6917-01
81	1.0860+01	5.9835+00	2.3471+00	9.5169+01	1.1248+02	-1.6064-01
82	1.0612+01	5.9713+00	2.3058+00	9.5317+01	1.1202+02	-1.5246-01
83	1.0366+01	5.9563+00	2.2519+00	9.5523+01	1.1145+02	-1.4460-01
84	1.0121+01	5.9385+00	2.1849+00	9.5794+01	1.1079+02	-1.3705-01
85	9.8776+00	5.9182+00	2.1034+00	9.6136+01	1.1004+02	-1.2976-01
86	9.6348+00	5.8957+00	2.0060+00	9.6558+01	1.0920+02	-1.2271-01

GEOMETRY ONLY, SCIRCLE RELEASE 2-0					DATE 053177	SA
87	9.3929+00	5.8711+00	1.8902+00	9.7064+01	1.0829+02	-1.1589-01
88	9.1518+00	5.8445+00	1.7526+00	9.7663+01	1.0731+02	-1.0927-01
89	8.9115+00	5.8163+00	1.5876+00	9.8358+01	1.0628+02	-1.0287-01
90	8.6717+00	5.7865+00	1.3854+00	9.9161+01	1.0519+02	-9.6754-02
91	8.4325+00	5.7553+00	1.1260+00	1.0338+02	1.0406+02	-9.1131-02
92	8.1937+00	5.7229+00	7.5256-01	1.0111+02	1.0289+02	-8.6904-02
93	7.9553+00	5.6895+00	0.0000	1.0170+02	1.0170+02	-8.9273-02
94	7.7172+00	5.6553+00	0.0000	1.0347+02	1.0047+02	-7.2387-02
95	7.4794+00	5.6203+00	0.0000	9.9235+01	9.9235+01	-5.5770-02
96	7.2417+00	5.5847+00	0.0000	9.7984+01	9.7984+01	-3.9412-02
97	7.0040+00	5.5488+00	0.0000	9.6726+01	9.6726+01	-2.3297-02
98	6.7664+00	5.5126+00	0.0000	9.5469+01	9.5469+01	-7.4086-03
99	6.5287+00	5.4763+00	0.0000	9.4216+01	9.4216+01	8.2700-03
100	6.2911+00	5.4401+00	0.0000	9.2975+01	9.2975+01	2.3749-02
101	6.0534+00	5.4042+00	0.0000	9.1751+01	9.1751+01	3.9042-02
102	5.8158+00	5.3687+00	0.0000	9.0549+01	9.0549+01	5.4169-02
103	5.5781+00	5.3337+00	0.0000	8.9374+01	8.9374+01	6.9155-02
104	5.3402+00	5.2995+00	0.0000	8.8232+01	8.8232+01	8.4021-02
105	5.1021+00	5.2662+00	0.0000	8.7127+01	8.7127+01	9.8791-02

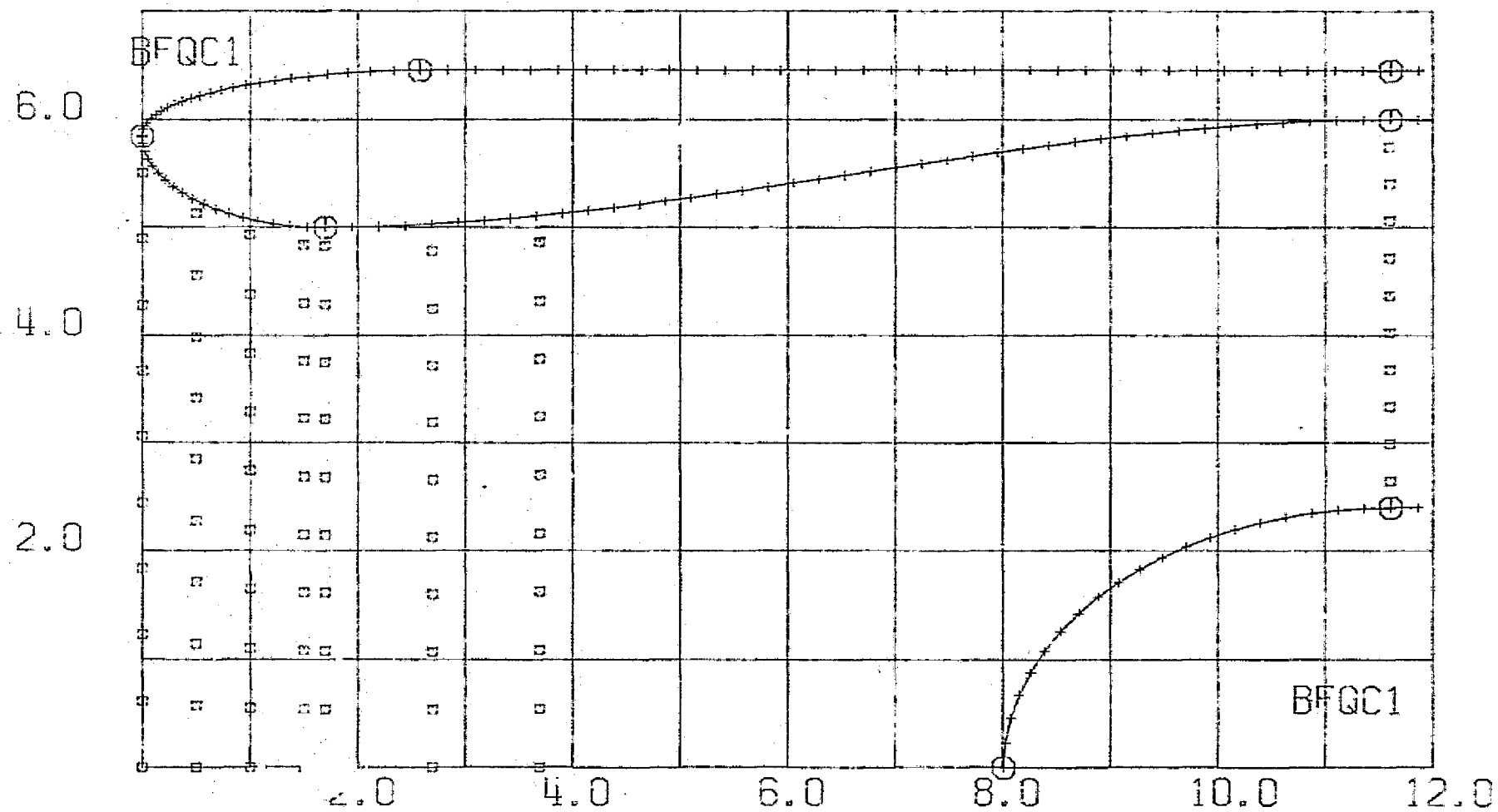
GEOMETRY ONLY, SCIRCLE RELEASE 2-C					DATE 053177	
106	4.8637+00	5.2340+00	0.0000	8.6063+01	8.6063+01	1.1349-01
107	4.6249+00	5.2029+00	0.0000	8.5045+01	8.5045+01	1.2810-01
108	4.3857+00	5.1733+00	0.0000	8.4078+01	8.4078+01	1.4276-01
109	4.1459+00	5.1452+00	0.0000	8.3167+01	8.3167+01	1.5738-01
110	3.9055+00	5.1188+00	0.0000	8.2317+01	8.2317+01	1.7201-01
111	3.6644+00	5.0944+00	0.0000	8.1532+01	8.1532+01	1.8669-01
112	3.4225+00	5.0720+00	0.0000	8.0817+01	8.0817+01	2.0143-01
113	3.1796+00	5.0519+00	0.0000	8.0178+01	8.0178+01	2.1629-01
114	2.9359+00	5.0343+00	0.0000	7.9620+01	7.9620+01	2.3118-01
115	2.6910+00	5.0193+00	0.0000	7.9149+01	7.9149+01	2.4616-01
116	2.4449+00	5.0073+00	0.0000	7.8770+01	7.8770+01	2.6129-01
117	2.1975+00	4.9984+00	0.0000	7.8490+01	7.8490+01	2.7655-01
118	1.9486+00	4.9929+00	0.0000	7.8317+01	7.8317+01	2.9195-01
119	1.6980+00	4.9910+00	0.0000	7.8257+01	7.8257+01	1.4697+00
120	1.5265+00	4.9953+00	0.0000	7.8393+01	7.8393+01	1.4880+00
121	1.3638+00	5.0076+00	0.0000	7.8779+01	7.8779+01	1.5412+00
122	1.2099+00	5.0268+00	0.0000	7.9385+01	7.9385+01	1.6293+00
123	1.0645+00	5.0523+00	0.0000	8.0192+01	8.0192+01	1.7553+00
124	9.2755-01	5.0834+00	0.0000	8.1183+01	8.1183+01	1.9251+00

GEOMETRY ONLY, SCIRCLE RELEASE 2-0

DATE 053177

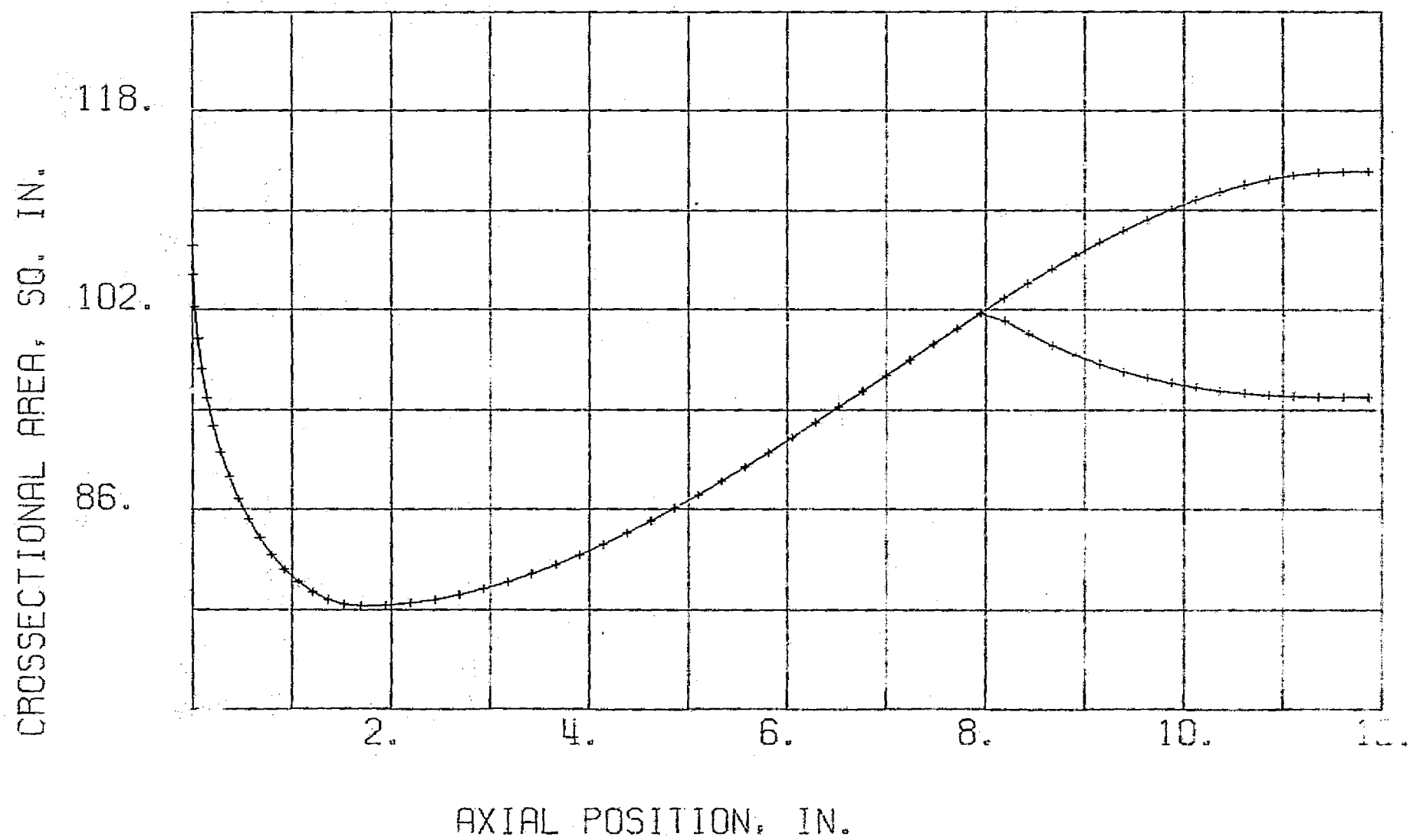
125	7.9897-01	5.1198+00	0.0000	8.2347+01	8.2347+01	2.1481+00
126	6.7865-01	5.1610+00	0.0000	8.3679+01	8.3679+01	2.4380+00
127	5.6654-01	5.2069+00	0.0000	8.5176+01	8.5176+01	2.8147+00
128	4.6268-01	5.2575+00	0.0000	8.6838+01	8.6838+01	3.3059+00
129	3.6912-01	5.3115+00	0.0000	8.8630+01	8.8630+01	3.9345+00
130	2.8454-01	5.3695+00	0.0000	9.0578+01	9.0578+01	4.7500+00
131	2.0945-01	5.4315+00	0.0000	9.2681+01	9.2681+01	5.8010+00
132	1.4455-01	5.4972+00	0.0000	9.4937+01	9.4937+01	7.1270+00
133	9.2773-02	5.5632+00	0.0000	9.7230+01	9.7230+01	8.6526+00
134	5.1724-02	5.6320+00	0.0000	9.9651+01	9.9651+01	1.0351+01
135	2.2269-02	5.7030+00	0.0000	1.0218+02	1.0218+02	1.2000+01
136	5.0333-03	5.7747+00	0.0000	1.0476+02	1.0476+02	1.3249+01
137	0.0000	5.8400+00	0.0000	1.0715+02	1.0715+02	0.0000

AFIN

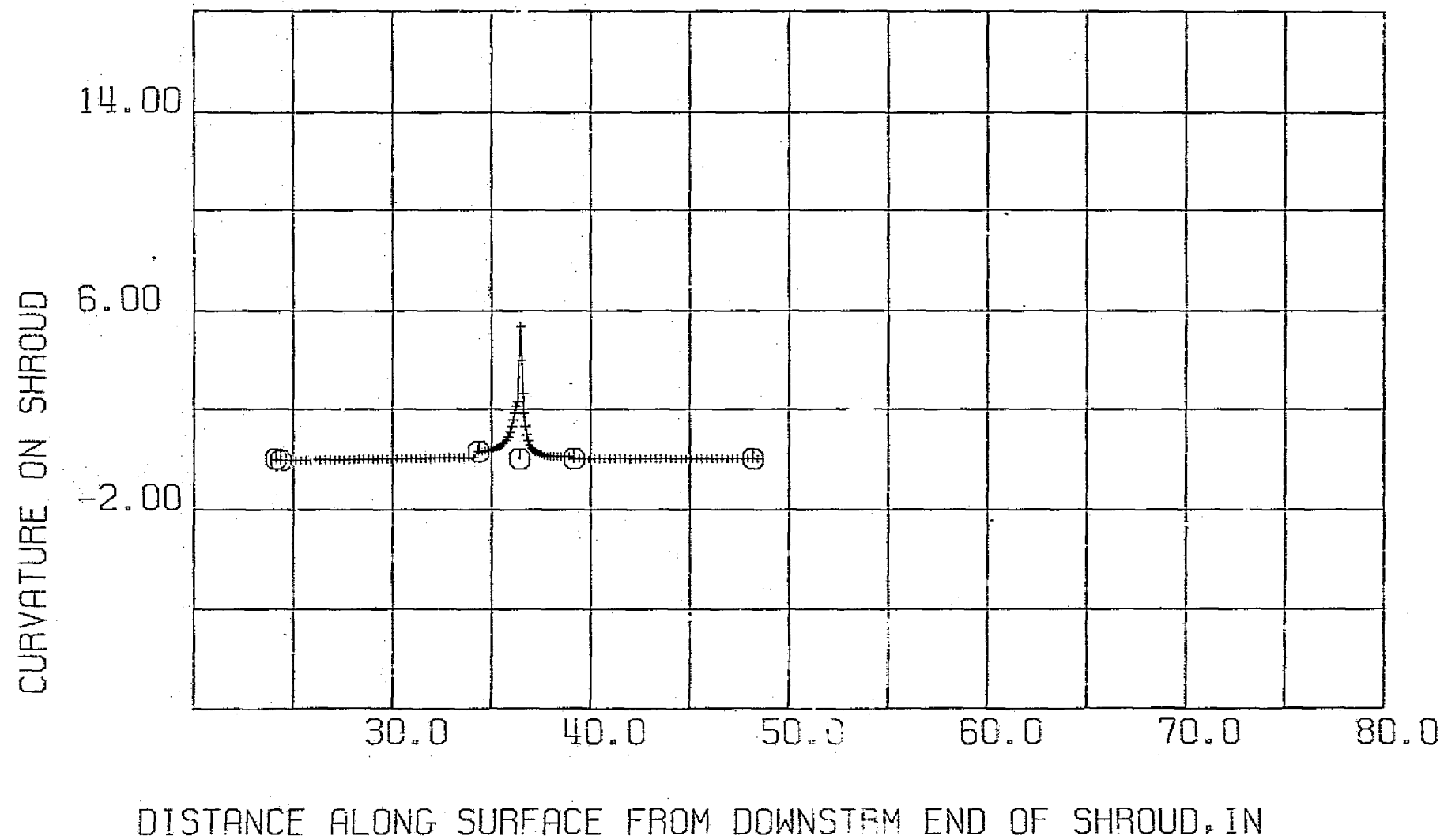


TEST CASE RELEASE 2.0

-293-



-294-



-295-

Program EOD

No input is shown for EOD since all EOD input is automatically generated in SCIRCL and passed on to EOD via mass storage file. No input cards need be punched.

POTENTIAL FLOW - EOD RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

PROGRAM EODF -- PARABOLIC AXISYMMETRIC AND CROSSFLOW

***** CASE CONTROL DATA *****

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1

BODIES = 2
NNU = 0
CHORD = 1.000000
MACH NO. = .00000000
TCNST = .0000000
EPSLOW = .000000
PSF NO. =

SURFACE OF REVOLUTION

CROSSFLOW

OFF-BODY POINTS

MATRIX SOLUTION BY TRIANGULARIZATION (SOLVIT)

STRIP VORTEX

PUNCHED OUTPUT

INPUT TAPE NO. FOR COORDINATES AND NON-UNIFORM FLOW ONLY = 5

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 49 MX = .0000000 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

CURVED ELEMENTS (IGENF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=3)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S		C O O R D I N A T E S								
UNTRANSFORMED		*** TRANSFORMED ***								
X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE	
1	8.01100	.00000	8.01100	.00000	8.01521	.11510	.23041	.23041	.00000	-.61275
2	8.02751	.22962	8.02751	.22962	8.04826	.34427	.23306	.46081	-8.13602	-.59811
3	8.07693	.45720	8.07693	.45720	8.11287	.56686	.23084	.69388	-7.75906	-.56266
4	8.15586	.67395	8.15586	.67395	8.20576	.77867	.23232	.92472	-7.19054	-.51807
5	8.26185	.88020	8.26185	.88020	8.32409	.97894	.23347	1.15675	-6.60032	-.47048
6	8.39166	1.07411	8.39166	1.07411	8.46460	1.16622	.23502	1.39021	-6.00200	-.42430
7	8.54204	1.25459	8.54204	1.25459	8.62411	1.33974	.23654	1.62523	-5.43825	-.38237
8	8.70994	1.42109	8.70994	1.42109	8.79680	1.49671	.23033	1.86177	-4.85768	-.34576
9	8.88659	1.56881	8.88659	1.56881	8.99029	1.63834	.23337	2.09211	-4.37280	-.31452
10	9.07647	1.70440	9.07647	1.70440	9.17597	1.76769	.23586	2.32548	-4.03965	-.28809
11	9.27756	1.82758	9.27756	1.82758	9.38195	1.88460	.23791	2.56134	-3.74851	-.26580
12	9.48809	1.93830	9.48809	1.93830	9.59658	1.98910	.23960	2.79925	-3.49908	-.24717
13	9.70653	2.03666	9.70653	2.03666	9.81843	2.08132	.24099	3.03885	-3.28822	-.23175
14	9.93155	2.12283	9.93155	2.12283	10.04629	2.16145	.24214	3.27983	-3.11242	-.21912
15	10.16201	2.19701	10.16201	2.19701	10.27907	2.22970	.24309	3.52197	-2.96739	-.20890
16	10.39693	2.25940	10.39693	2.25940	10.51587	2.28626	.24388	3.76506	-2.85140	-.20080
17	10.63543	2.31020	10.63543	2.31020	10.75586	2.33131	.24453	4.00894	-2.76019	-.19458
18	10.87676	2.34955	10.87676	2.34955	10.99831	2.36499	.24507	4.25343	-2.69204	-.19006
19	11.12020	2.37759	11.12020	2.37759	11.24256	2.38740	.24552	4.49855	-2.64522	-.18712
20	11.36512	2.39440	11.36512	2.39440	11.48804	2.39818	.24596	4.74406	-2.61928	-.18309

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2-3

2-BODY

NN = 49 MX = .0000000 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

CURVED ELEMENTS (IGCOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=0)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S										
UNTRANSFORMED				*** TRANSFORMED ***						
	X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE
21	11.61100	2.40000	11.61100	2.40000	11.73855	2.40000	.25509	4.99002	-1.30574	.00000
22	11.86609	2.40000	11.86609	2.40000	12.51915	2.40000	.30611	5.24511	.00000	.00000
23	12.17220	2.40000	12.17220	2.40000	12.35587	2.40000	.36733	5.55122	.00000	.00000
24	12.53954	2.40000	12.53954	2.40000	12.75994	2.40000	.44080	5.91855	.00000	.00000
25	12.98033	2.40000	12.98033	2.40000	13.24481	2.40000	.52896	6.35935	.00000	.00000
26	13.50929	2.40000	13.50929	2.40000	13.82667	2.40000	.63475	6.88631	.00000	.00000
27	14.14404	2.40000	14.14404	2.40000	14.52490	2.40000	.76170	7.52306	.00000	.00000
28	14.90575	2.40000	14.90575	2.40000	15.36277	2.40000	.91404	8.28476	.00000	.00000
29	15.81979	2.40000	15.81979	2.40000	16.32429	2.40000	1.00901	9.19681	.00000	.00000
30	16.82880	2.40000	16.82880	2.40000	17.33330	2.40000	1.00901	10.20782	.00000	.00000
31	17.83781	2.40000	17.83781	2.40000	18.34231	2.40000	1.00901	11.21683	.00000	.00000
32	18.84682	2.40000	18.84682	2.40000	19.35132	2.40000	1.00901	12.22584	.00000	.00000
33	19.85583	2.40000	19.85583	2.40000	20.36034	2.40000	1.00901	13.23485	.00000	.00000
34	20.86484	2.40000	20.86484	2.40000	21.36935	2.40000	1.00901	14.24386	.00000	.00000
35	21.87385	2.40000	21.87385	2.40000	22.37836	2.40000	1.00901	15.25287	.00000	.00000
36	22.88286	2.40000	22.88286	2.40000	23.38737	2.40000	1.00901	16.26188	.00000	.00000
37	23.89187	2.40000	23.89187	2.40000	24.39638	2.40000	1.00901	17.27089	.00000	.00000
38	24.90088	2.40000	24.90088	2.40000	25.40539	2.40000	1.00901	18.27990	.00000	.00000
39	25.90989	2.40000	25.90989	2.40000	26.41440	2.40000	1.00901	19.28891	.00000	.00000
40	26.91890	2.40000	26.91890	2.40000	27.42341	2.40000	1.00901	20.29792	.00000	.00000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 49 MX = .000000 HY = .000000
THETA = .000000 ADDX = .000000 ADDY = .000000
XE = .000000 YE = .000000

CURVED ELEMENTS (IGCOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=3)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S										
UNTRANSFORMED		*** TRANSFORMED ***								
X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE	
41	27.92791	2.40000	27.92791	2.40000	28.43242	2.40000	1.00901	21.30693	.00000	.00000
42	28.93692	2.40000	28.93692	2.40000	29.44143	2.40000	1.00901	22.31594	.00000	.00000
43	29.94594	2.40000	29.94594	2.40000	30.45044	2.40000	1.00901	23.32495	.00000	.00000
44	30.95495	2.40000	30.95495	2.40000	31.45945	2.40000	1.00901	24.33396	.00000	.00000
45	31.96396	2.40000	31.96396	2.40000	32.46846	2.40000	1.00901	25.34297	.00000	.00000
46	32.97297	2.40000	32.97297	2.40000	33.47747	2.40000	1.00901	26.35198	.00000	.00000
47	33.98198	2.40000	33.98198	2.40000	34.48648	2.40000	1.00901	27.36099	.00000	.00000
48	34.99099	2.40000	34.99099	2.40000	35.49549	2.40000	1.00901	28.37001	.00000	.00000
49	36.00000	2.40000	36.00000	2.40000						

POTENTIAL FLOW - FOMF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TFST CASE RELEASE 2.2

2-BODY

AN = 174 MX = .000000 MY = .000000
THETA = .000000 ADDX = .000000 ADDY = .000000
XE = .000000 YE = .000000

CURVED ELEMENTS (IGEOHFE) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=0)
NEW VELOCITY FORMULAE ARE USED.

ON - BODY COORDINATES										
UNTRANSFORMED		*** TRANSFORMED ***								
X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE	
1	36.00000	6.00000	36.00000	6.00000	35.49549	6.00000	1.00901	1.00901	.00000	.00000
2	34.99099	6.00000	34.99099	6.00000	34.48645	6.00000	1.00901	2.01802	.00000	.00000
3	33.98198	6.00000	33.98198	6.00000	33.47747	6.00000	1.00901	3.02704	.00000	.00000
4	32.97297	6.00000	32.97297	6.00000	32.46846	6.00000	1.00901	4.03605	.00000	.00000
5	31.96396	6.00000	31.96396	6.00000	31.45945	6.00000	1.00901	5.04506	.00000	.00000
6	30.95495	6.00000	30.95495	6.00000	30.45044	6.00000	1.00901	6.05407	.00000	.00000
7	29.94594	6.00000	29.94594	6.00000	29.44143	6.00000	1.00901	7.06308	.00000	.00000
8	28.93692	6.00000	28.93692	6.00000	28.43242	6.00000	1.00901	8.07209	.00000	.00000
9	27.92791	6.00000	27.92791	6.00000	27.42341	6.00000	1.00901	9.08110	.00000	.00000
10	26.91890	6.00000	26.91890	6.00000	26.41440	6.00000	1.00901	10.09011	.00000	.00000
11	25.90989	6.00000	25.90989	6.00000	25.40539	6.00000	1.00901	11.09912	.00000	.00000
12	24.90088	6.00000	24.90088	6.00000	24.39638	6.00000	1.00901	12.10813	.00000	.00000
13	23.89187	6.00000	23.89187	6.00000	23.38737	6.00000	1.00901	13.11714	.00000	.00000
14	22.88286	6.00000	22.88286	6.00000	22.37836	6.00000	1.00901	14.12615	.00000	.00000
15	21.87385	6.00000	21.87385	6.00000	21.36935	6.00000	1.00901	15.13516	.00000	.00000
16	20.86484	6.00000	20.86484	6.00000	20.36034	6.00000	1.00901	16.14417	.00000	.00000
17	19.85583	6.00000	19.85583	6.00000	19.35132	6.00000	1.00901	17.15318	.00000	.00000
18	18.84682	6.00000	18.84682	6.00000	18.34231	6.00000	1.00901	18.16219	.00000	.00000
19	17.83781	6.00000	17.83781	6.00000	17.33330	6.00000	1.00901	19.17120	.00000	.00000
20	16.82880	6.00000	16.82880	6.00000	16.32429	6.00000	1.00901	20.18021	.00000	.00000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 174 NX = .000000 NY = .000000
THEYA = .000000 ADDX = .000000 ADDY = .000000
XE = .000000 YE = .000000

CURVED ELEMENTS (IGCOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=3)
NEW VELOCITY FORMULAE ARE USED.

ON - BODY COORDINATES											
UNTRANSFORMED				*** TRANSFORMED ***							
	X	Y		X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE
21	15.81979	6.00000	15.81979	6.00000		15.36277	6.00000	.91404	21.16922	.00000	.00000
22	14.90575	6.00000	14.90575	6.00000		16.52490	6.00000	.76173	22.10327	.00000	.00000
23	14.14404	6.00000	14.14404	6.00000		13.82667	6.00000	.63475	22.86497	.00000	.00000
24	13.50929	6.00000	13.50929	6.00000		13.24481	6.00000	.52896	23.49972	.00000	.00000
25	12.98033	6.00000	12.98033	6.00000		12.75994	6.00000	.44083	24.02868	.00000	.00000
26	12.53954	6.00000	12.53954	6.00000		12.35587	6.00000	.36733	24.44948	.00000	.00000
27	12.17220	6.00000	12.17220	6.00000		12.01915	6.00000	.30611	24.83681	.00000	.00000
28	11.86609	6.00000	11.86609	6.00000		11.73855	6.00000	.25507	25.14292	.00000	.00000
29	11.61100	6.00000	11.61100	6.00000		11.48493	5.99937	.25215	25.39801	-359.56256	.04195
30	11.35886	5.99807	11.35886	5.99807		11.23364	5.99572	.25348	25.65016	.84176	.05685
31	11.10845	5.99248	11.10845	5.99248		10.98402	5.98840	.24899	25.90064	.79118	.05369
32	10.85962	5.98349	10.85962	5.98349		10.73591	5.97780	.24768	26.14963	.74172	.05053
33	10.61224	5.97134	10.61224	5.97134		10.48919	5.96416	.24652	26.39731	.69335	.04738
34	10.36618	5.95626	10.36618	5.95626		10.24373	5.94771	.24553	26.64383	.64599	.04420
35	10.12133	5.93849	10.12133	5.93849		9.99943	5.92867	.24463	26.88932	.59962	.04113
36	9.87757	5.91823	9.87757	5.91823		9.75616	5.90724	.24382	27.13393	.55412	.03803
37	9.63480	5.89569	9.63480	5.89569		9.51383	5.88363	.24313	27.37774	.50954	.03497
38	9.39292	5.87106	9.39292	5.87106		9.27235	5.85802	.24254	27.62287	.46578	.03193
39	9.15184	5.84452	9.15184	5.84452		9.03162	5.83061	.24203	27.86341	.42268	.02891
40	8.91146	5.81627	8.91146	5.81627		8.79155	5.80156	.24167	28.10545	.38038	.02592

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 174 MX = .0000000 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

CURVED ELEMENTS (IGEDMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=0)
NEW VELOCITY FORMULAE ARE USED.

ON - BODY COORDINATES											
*** UNTRANSFORMED ***				*** TRANSFORMED ***							
	X	Y		X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE
41	8.67170	5.78648	8.67170	5.78648		8.55237	5.77106	.24124	28.34705	.33854	.02296
42	8.43248	5.75531	8.43248	5.75531		8.31307	5.73928	.24095	28.58830	.29742	.02001
43	8.19371	5.72295	8.19371	5.72295		8.07450	5.70637	.24072	28.82924	.25665	.01708
44	7.95532	5.68955	7.95532	5.68955		7.83626	5.67251	.24054	29.06996	.21636	.01417
45	7.71724	5.65527	7.71724	5.65527		7.59829	5.63785	.24042	29.31050	.17640	.01127
46	7.47938	5.62028	7.47938	5.62028		7.36051	5.60256	.24035	29.55092	.13668	.00837
47	7.24167	5.58473	7.24167	5.58473		7.12285	5.56679	.24033	29.79127	.09718	.00544
48	7.00404	5.54878	7.00404	5.54878		6.88523	5.53070	.24036	30.03160	.05784	.00237
49	6.76642	5.51259	6.76642	5.51259		6.64758	5.49444	.24044	30.27196	.01848	.00000
50	6.52874	5.47630	6.52874	5.47630		6.40990	5.45819	.24042	30.51240	-.02078	-.00257
51	6.29106	5.44011	6.29106	5.44011		6.17225	5.42211	.24132	30.75282	-.06010	-.00562
52	6.05344	5.40418	6.05344	5.40418		5.93463	5.38637	.24027	30.99314	-.09951	-.00854
53	5.81581	5.36867	5.81581	5.36867		5.69696	5.35112	.24027	31.23341	-.13890	-.01144
54	5.57810	5.33374	5.57810	5.33374		5.45918	5.31654	.24032	31.47368	-.17852	-.01434
55	5.34023	5.29954	5.34023	5.29954		5.22119	5.28277	.24042	31.71399	-.21837	-.01725
56	5.10212	5.26624	5.10212	5.26624		4.98294	5.24996	.24058	31.95441	-.25849	-.02017
57	4.86372	5.23398	4.86372	5.23398		4.74435	5.21830	.24080	32.19449	-.29910	-.02311
58	4.62493	5.20295	4.62493	5.20295		4.50533	5.18793	.24108	32.43579	-.33997	-.02607
59	4.38568	5.17329	4.38568	5.17329		4.26581	5.15903	.24143	32.67686	-.38152	-.02906
60	4.14589	5.14519	4.14589	5.14519		4.02571	5.13177	.24185	32.91829	-.42353	-.03206

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY

NN = 170 MX = .0000000 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XC = .0000000 YE = .0000000

CURVED ELEMENTS(IGEOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES(IGISGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES(IGURVN=3)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S										
UNTRANSFORMED				*** TRANSFORMED ***						
	X	Y		X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	O ALPHA
										CURVATURE
61	3.90548	5.11882		3.90548	5.11882	3.78495	5.10633	.24236	33.16015	-.46619
62	3.66437	5.09435		3.66437	5.09435	3.54343	5.08289	.24295	33.40250	-.50957
63	3.42245	5.07198		3.42245	5.07198	3.30107	5.06163	.24364	33.64545	-.55362
64	3.17965	5.05188		3.17965	5.05188	3.05777	5.04275	.24443	33.88509	-.59854
65	2.93585	5.03427		2.93585	5.03427	2.81343	5.02645	.24534	34.13352	-.64427
66	2.69097	5.01934		2.69097	5.01934	2.56794	5.01295	.24638	34.37866	-.69095
67	2.44488	5.00732		2.44488	5.00732	2.32119	5.00244	.24757	34.62524	-.73842
68	2.19748	4.99843		2.19748	4.99843	2.07306	4.99522	.24891	34.87280	-.78702
69	1.94863	4.99290		1.94863	4.99290	1.82332	4.99120	.25064	35.12171	-.83685
70	1.69800	4.99100		1.69800	4.99100	1.61224	4.99238	.17154	35.37236	358.11524
71	1.52653	4.99534		1.52653	4.99534	1.44511	5.00047	.16317	35.54389	-2.86063
72	1.36384	5.00760		1.36384	5.00760	1.28673	5.01628	.15519	35.70706	-2.81035
73	1.20986	5.02684		1.20986	5.02684	1.13701	5.03867	.14762	35.86225	-2.91457
74	1.06448	5.05231		1.06448	5.05231	.99582	5.06699	.14043	36.00986	-2.86954
75	.92755	5.08343		.92755	5.08343	.86302	5.10074	.13363	36.15029	-2.97599
76	.79897	5.11976		.79897	5.11976	.73852	5.13953	.12721	36.28393	-3.13825
77	.67865	5.16101		.67865	5.16101	.62224	5.18312	.12118	36.41114	-3.36526
78	.56654	5.20695		.56654	5.20695	.51419	5.23135	.11553	36.53231	-3.67042
79	.46268	5.25750		.46268	5.25750	.41540	5.28363	.10804	36.64785	-4.02910
80	.36912	5.31149		.36912	5.31149	.32623	5.33963	.10261	36.75589	-4.48014

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY

NN = 174
THETA = .0000000
XE = .0000000
MX = .0000000
AGX = .0000000
YE = .0000000
MY = .0000000
ADDY = .0000000

CURVED ELEMENTS (IGCOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=0)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S									
UNTRANSFORMED				*** TRANSFORMED ***					
	X	Y		X	Y	X C.P.	Y C.P.	DELTA S	SUMDS
								D ALPHA	CURVATURE
81	.28454	5.36954	.28454	5.36954		.24626	5.39964	.09741	36.85850
82	.20945	5.43152	.20945	5.43152		.17511	5.46349	.09239	36.95591
83	.14455	5.49722	.14455	5.49722		.11768	5.52944	.08393	37.04830
84	.09277	5.56321	.09277	5.56321		.07108	5.59693	.08021	37.13223
85	.05172	5.63205	.05172	5.63205		.03566	5.66694	.07685	37.21244
86	.02227	5.70295	.02227	5.70295		.01221	5.73847	.07385	37.28929
87	.00503	5.77468	.00503	5.77468		.00103	5.80722	.06561	37.36314
88	.00000	5.84000	.00000	5.84000		.00270	5.87436	.06900	37.42874
89	.01025	5.90800	.01025	5.90800		.02326	5.93735	.06428	37.49774
90	.04037	5.96453	.04037	5.96453		.05969	5.98791	.06070	37.56201
91	.08124	6.00927	.08124	6.00927		.10216	6.02710	.05498	37.62272
92	.12412	6.04363	.12412	6.04363		.14919	6.06054	.06049	37.67770
93	.17501	6.07628	.17501	6.07628		.20383	6.09229	.06594	37.73818
94	.23321	6.10725	.23321	6.10725		.26558	6.12246	.07153	37.80412
95	.29837	6.13672	.29837	6.13672		.33424	6.15124	.07739	37.87565
96	.37044	6.16491	.37044	6.16491		.40985	6.17884	.08360	37.95304
97	.44952	6.19198	.44952	6.19198		.49259	6.20540	.09022	38.03663
98	.53588	6.21809	.53588	6.21809		.58278	6.23104	.09732	38.12686
99	.62987	6.24331	.62987	6.24331		.68083	6.25584	.10494	38.22418
100	.73194	6.26771	.73194	6.26771		.78719	6.27983	.11313	38.32912

POTENTIAL FLOW - EOOD RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 174 MX = .0000000 HY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

CURVED ELEMENTS(IGEOHF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES(ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES(ICURVN=0)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S										
UNTRANSFORMED				*** TRANSFORMED ***						
	X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	O ALPHA	CURVATURE
101	.84258	6.29130	.84258	6.29130	.90242	6.30301	.12194	38.44226	-1.27542	-.17491
102	.96238	6.31407	.96238	6.31407	1.02712	6.32534	.13143	38.56420	-1.17266	-.15030
103	1.09197	6.33597	1.09197	6.33597	1.16196	6.34676	.14163	38.69563	-1.09393	-.13110
104	1.23204	6.35689	1.23204	6.35689	1.30767	6.36713	.15263	38.83726	-1.03615	-.11618
105	1.38338	6.37671	1.38338	6.37671	1.46505	6.38631	.16446	38.98989	-.99750	-.10480
106	1.54679	6.39521	1.54679	6.39521	1.63496	6.40406	.17721	39.15435	-.97892	-.09655
107	1.72319	6.41215	1.72319	6.41215	1.81834	6.42005	.19095	39.33156	-.98315	-.09142
108	1.91355	6.42713	1.91355	6.42713	2.01620	6.43385	.20574	39.52251	-1.01899	-.09013
109	2.11891	6.43962	2.11891	6.43962	2.22963	6.44480	.22169	39.72825	-1.10949	-.09678
110	2.34040	6.44879	2.34040	6.44879	2.46069	6.45151	.24064	39.94994	-1.36908	-.08516
111	2.58100	6.45300	2.58100	6.45300	2.71000	6.45300	.25800	40.19058	-1.00222	.00000
112	2.83900	6.45300	2.83900	6.45300	2.96800	6.45300	.25800	40.44858	.00000	.00000
113	3.09700	6.45300	3.09700	6.45300	3.22000	6.45300	.25800	40.70658	.00000	.00000
114	3.35500	6.45300	3.35500	6.45300	3.48400	6.45300	.25800	40.96458	.00000	.00000
115	3.61300	6.45300	3.61300	6.45300	3.74200	6.45300	.25800	41.22258	.00000	.00000
116	3.87100	6.45300	3.87100	6.45300	4.00000	6.45300	.25800	41.48058	.00000	.00000
117	4.12900	6.45300	4.12900	6.45300	4.25800	6.45300	.25800	41.73858	.00000	.00000
118	4.36700	6.45300	4.36700	6.45300	4.51600	6.45300	.25800	41.99658	.00000	.00000
119	4.64500	6.45300	4.64500	6.45300	4.77400	6.45300	.25800	42.25458	.00000	.00000
120	4.90300	6.45300	4.90300	6.45300	5.03200	6.45300	.25800	42.51258	.00000	.00000

POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NX = 174 4X = .000000 MY = .000000
THETA = .000000 ADDX = .000000 ADDY = .000000
XF = .000000 YE = .000000

CURVED ELEMENTS (IGOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=3)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y C O O R D I N A T E S										
UNTRANSFORMED		*** TRANSFORMED ***								
X	Y	X	Y	Z C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE	
121	5.16100	6.45300	5.16100	6.45300	5.29300	6.45300	.25800	42.77056	.00000	.00000
122	5.41900	6.45300	5.41900	6.45300	5.54800	6.45300	.25800	43.02058	.00000	.00000
123	5.67700	6.45300	5.67700	6.45300	5.80600	6.45300	.25800	43.28658	.00000	.00000
124	5.93500	6.45300	5.93500	6.45300	6.06400	6.45300	.25800	43.54458	.00000	.00000
125	6.19300	6.45300	6.19300	6.45300	6.32200	6.45300	.25800	43.80258	.00000	.00000
126	6.45100	6.45300	6.45100	6.45300	6.58000	6.45300	.25800	44.06058	.00000	.00000
127	6.70900	6.45300	6.70900	6.45300	6.83800	6.45300	.25800	44.31857	.00000	.00000
128	6.96700	6.45300	6.96700	6.45300	7.09600	6.45300	.25800	44.57657	.00000	.00000
129	7.22500	6.45300	7.22500	6.45300	7.35400	6.45300	.25800	44.83457	.00000	.00000
130	7.48300	6.45300	7.48300	6.45300	7.61200	6.45300	.25800	45.09257	.00000	.00000
131	7.74100	6.45300	7.74100	6.45300	7.87000	6.45300	.25800	45.35057	.00000	.00000
132	7.99900	6.45300	7.99900	6.45300	8.12800	6.45300	.25800	45.60857	.00000	.00000
133	8.25700	6.45300	8.25700	6.45300	8.38600	6.45300	.25800	45.86657	.00000	.00000
134	8.51500	6.45300	8.51500	6.45300	8.64400	6.45300	.25800	46.12457	.00000	.00000
135	8.77300	6.45300	8.77300	6.45300	8.90200	6.45300	.25800	46.38257	.00000	.00000
136	9.03100	6.45300	9.03100	6.45300	9.16000	6.45300	.25800	46.64057	.00000	.00000
137	9.28900	6.45300	9.28900	6.45300	9.41800	6.45300	.25800	46.89857	.00000	.00000
138	9.54700	6.45300	9.54700	6.45300	9.67600	6.45300	.25800	47.15657	.00000	.00000
139	9.80500	6.45300	9.80500	6.45300	9.93400	6.45300	.25800	47.41457	.00000	.00000
140	10.06300	6.45300	10.06300	6.45300	10.19200	6.45300	.25800	47.67257	.00000	.00000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY

NH = 174 MX = .000000 MY = .000000
THETA = .000000 ADDX = .000000 ADDY = .000000
XE = .000000 YE = .000000

CURVED ELEMENTS (IGCOMP=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (SIGF=0)
NEW VELOCITY FORMULAE ARE USED.

INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=3)

O N - B O D Y C O O R D I N A T E S									
*** UNTRANSFORMED ***				*** TRANSFORMED ***					
	X	Y		X	Y	X C.P.	Y C.P.	DELTA S	CURVATURE
141	10.32100	6.45300	10.32100	6.45300		10.45000	6.45300	.25833	.00000
142	10.57900	6.45300	10.57900	6.45300		10.70800	6.45300	.25800	.00000
143	10.83700	6.45300	10.83700	6.45300		10.96600	6.45300	.25800	.00000
144	11.09500	6.45300	11.09500	6.45300		11.22400	6.45300	.25800	.00000
145	11.35300	6.45300	11.35300	6.45300		11.48200	6.45300	.25800	.00000
146	11.61100	6.45300	11.61100	6.45300		11.74000	6.45300	.25800	.00000
147	11.86900	6.45300	11.86900	6.45300		12.00000	6.45300	.30967	.00000
148	12.17860	6.45300	12.17860	6.45300		12.36436	6.45300	.37152	.00000
149	12.55012	6.45300	12.55012	6.45300		12.77303	6.45300	.44582	.00000
150	12.99594	6.45300	12.99594	6.45300		13.26344	6.45300	.53499	.00000
151	13.53093	6.45300	13.53093	6.45300		13.85193	6.45300	.64199	.00000
152	14.17292	6.45300	14.17292	6.45300		14.55811	6.45300	.77038	.00000
153	14.94330	6.45300	14.94330	6.45300		15.40553	6.45300	.92446	.00000
154	15.86776	6.45300	15.86776	6.45300		16.37107	6.45300	1.00661	.00000
155	16.87438	6.45300	16.87438	6.45300		17.37766	6.45300	1.00661	.00000
156	17.88099	6.45300	17.88099	6.45300		18.38429	6.45300	1.00661	.00000
157	18.88760	6.45300	18.88760	6.45300		19.39097	6.45300	1.00661	.00000
158	19.89421	6.45300	19.89421	6.45300		20.39752	6.45300	1.00661	.00000
159	20.90082	6.45300	20.90082	6.45300		21.40413	6.45300	1.00661	.00000
160	21.90743	6.45300	21.90743	6.45300		22.41074	6.45300	1.00661	.00000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 174
THEIA = .000000
XE = .000000
MX = .000000
ADDX = .000000
YE = .000000
MY = .000000
ADDDY = .000000

CURVED ELEMENTS (IGCOMF=0) PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0) INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVM=0)
NEW VELOCITY FORMULAE ARE USED.

O N - B O D Y - C O O R D I N A T E S										
UNTRANSFORMED		*** TRANSFORMED ***								
X	Y	X	Y	X C.P.	Y C.P.	DELTA S	SUMDS	D ALPHA	CURVATURE	
161	22.91405	6.45300	22.91405	6.45300	23.41735	6.45300	1.00661	60.52362	.00000	.00000
162	23.92066	6.45300	23.92066	6.45300	24.42396	6.45300	1.00661	61.53023	.00000	.00000
163	24.92727	6.45300	24.92727	6.45300	25.43058	6.45300	1.00661	62.53684	.00000	.00000
164	25.93388	6.45300	25.93388	6.45300	26.43719	6.45300	1.00661	63.54345	.00000	.00000
165	26.94049	6.45300	26.94049	6.45300	27.44380	6.45300	1.00661	64.55006	.00000	.00000
166	27.94710	6.45300	27.94710	6.45300	28.45041	6.45300	1.00661	65.55668	.00000	.00000
167	28.95372	6.45300	28.95372	6.45300	29.45702	6.45300	1.00661	66.56329	.00000	.00000
168	29.96033	6.45300	29.96033	6.45300	30.46363	6.45300	1.00661	67.56990	.00000	.00000
169	30.96694	6.45300	30.96694	6.45300	31.47025	6.45300	1.00661	68.57651	.00000	.00000
170	31.97355	6.45300	31.97355	6.45300	32.47686	6.45300	1.00661	69.58312	.00000	.00000
171	32.98016	6.45300	32.98016	6.45300	33.48347	6.45300	1.00661	70.58973	.00000	.00000
172	33.98678	6.45300	33.98678	6.45300	34.49008	6.45300	1.00661	71.59635	.00000	.00000
173	34.99339	6.45300	34.99339	6.45300	35.49669	6.45300	1.00661	72.60296	.00000	.00000
174	36.00000	6.45300	36.00000	6.45300						

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 90 MX = .0000000 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

O F F - B O D Y C O O R D I N A T E S

UNTRANSFORMED *** TRANSFORMED ***
X Y X Y

1	-.50000	.00000	-.50000	.00000
2	-.51000	.72222	-.50000	.72222
3	-.50000	1.44444	-.50000	1.44444
4	-.50000	2.16667	-.50000	2.16667
5	-.50000	2.88889	-.50000	2.88889
6	-.50000	3.61111	-.50000	3.61111
7	-.50000	4.33333	-.50000	4.33333
8	-.50000	5.05556	-.50000	5.05556
9	-.50000	5.77778	-.50000	5.77778
10	-.50000	6.50000	-.50000	6.50000
11	.00000	.00000	.00000	.00000
12	.00000	.61111	.00000	.61111
13	.00000	1.22222	.00000	1.22222
14	.00000	1.83333	.00000	1.83333
15	.00000	2.44444	.00000	2.44444
16	.00000	3.05556	.00000	3.05556
17	.00000	3.66667	.00000	3.66667
18	.00000	4.27778	.00000	4.27778
19	.00000	4.88889	.00000	4.88889
20	.00000	5.50000	.00000	5.50000
21	.50000	.00000	.50000	.00000
22	.50000	.56922	.50000	.56922
23	.50000	1.13843	.50000	1.13843
24	.50000	1.70765	.50000	1.70765
25	.50000	2.27686	.50000	2.27686
26	.50000	2.84608	.50000	2.84608
27	.50000	3.41530	.50000	3.41530
28	.50000	3.98451	.50000	3.98451
29	.50000	4.55373	.50000	4.55373
30	.50000	5.12294	.50000	5.12294
31	1.00000	.00000	1.00000	.00000
32	1.00000	.54730	1.00000	.54730
33	1.00000	1.09460	1.00000	1.09460
34	1.00000	1.64189	1.00000	1.64189
35	1.00000	2.18919	1.00000	2.18919
36	1.00000	2.73649	1.00000	2.73649
37	1.00000	3.28379	1.00000	3.28379
38	1.00000	3.83109	1.00000	3.83109
39	1.00000	4.37838	1.00000	4.37838
40	1.00000	4.92568	1.00000	4.92568

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2-G

2-BODY

NN = 90 MX = .3300300 MY = .0000000
THETA = .0000000 ADDX = .0000000 ADDY = .0000000
XE = .0300000 YE = .0000000

OFF - BODY COORDINATES

UNTRANSFORMED *** TRANSFORMED ***
X Y X Y

41	1.50000	.00000	1.50000	.00000
42	1.50000	.53707	1.50000	.53707
43	1.50000	1.07414	1.50000	1.07414
44	1.50000	1.61122	1.50000	1.61122
45	1.50000	2.14829	1.50000	2.14829
46	1.50000	2.68536	1.50000	2.68536
47	1.50000	3.22243	1.50000	3.22243
48	1.50000	3.75951	1.50000	3.75951
49	1.50000	4.29658	1.50000	4.29658
50	1.50000	4.83365	1.50000	4.83365
51	1.69800	.00000	1.69800	.00000
52	1.69800	.53550	1.69800	.53550
53	1.69800	1.07099	1.69800	1.07099
54	1.69800	1.60649	1.69800	1.60649
55	1.69800	2.14199	1.69800	2.14199
56	1.69800	2.67749	1.69800	2.67749
57	1.69800	3.21298	1.69800	3.21298
58	1.69800	3.74848	1.69800	3.74848
59	1.69800	4.28398	1.69800	4.28398
60	1.69800	4.81947	1.69800	4.81947
61	2.69800	.00000	2.69800	.00000
62	2.69800	.53049	2.69800	.53049
63	2.69800	1.06098	2.69800	1.06098
64	2.69800	1.59146	2.69800	1.59146
65	2.69800	2.12195	2.69800	2.12195
66	2.69800	2.65244	2.69800	2.65244
67	2.69800	3.18293	2.69800	3.18293
68	2.69800	3.71342	2.69800	3.71342
69	2.69800	4.24391	2.69800	4.24391
70	2.69800	4.77439	2.69800	4.77439
71	3.69800	.00000	3.69800	.00000
72	3.69800	.53948	3.69800	.53948
73	3.69800	1.07895	3.69800	1.07895
74	3.69800	1.61843	3.69800	1.61843
75	3.69800	2.15791	3.69800	2.15791
76	3.69800	2.69738	3.69800	2.69738
77	3.69800	3.23686	3.69800	3.23686
78	3.69800	3.77634	3.69800	3.77634
79	3.69800	4.31581	3.69800	4.31581
80	3.69800	4.85529	3.69800	4.85529

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POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY

NN = 90 4X = .0000000 HY = .0000000
THETA = .0300000 ADDX = .0000000 ADDY = .0000000
XE = .0000000 YE = .0000000

O F F - B O D Y C O O R D I N A T E S

UNTRANSFORMED *** TRANSFORMED ***
X Y X Y

81	11.60000	2.64581	11.60000	2.64581
82	11.60000	2.99048	11.60000	2.99048
83	11.60000	3.33514	11.60000	3.33514
84	11.60000	3.67981	11.60000	3.67981
85	11.60000	4.02448	11.60000	4.02448
86	11.60000	4.36914	11.60000	4.36914
87	11.60000	4.71381	11.60000	4.71381
88	11.60000	5.05847	11.60000	5.05847
89	11.60000	5.40314	11.60000	5.40314
90	11.60000	5.74781	11.60000	5.74781

A REWIND WAS ATTEMPTED ON A SYMBIONT DEVICE - IGNORED
I/O CALLED AT SEQUENCE NUMBER 000132 OF MATRIX

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

MATRIX FORMATION TOOK .000 SECONDS
(THE NUMBER OF TIMES THAT SMALL ELEMENT FORMULAE WERE USED WAS 0.)

THE 221 X 221 MATRIX WITH 3 RIGHT SIDES WAS SOLVED DIRECTLY IN .300 MINUTES.

THE 221 X 221 MATRIX WITH 1 RIGHT SIDES WAS SOLVED DIRECTLY IN .000 MINUTES.

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POTENTIAL FLOW - EODF RELEASE 2

MATRIX PREPARATION AND ALL SOLUTIONS TOOK

.333 SECONDS

DATE 053177

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. 0F0C1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
1	8.0110000	.2000000							
	8.0152385	.1151029	.0977351	.9954479	.99742	.07174	-.1044161	.0000001	.0000000
2	8.0275149	.2296225							
	8.0482578	.3442699	.2877792	.9171931	.97723	.21217	-.1019876	.0000001	.0000000
3	8.0769252	.4571968							
	8.1128749	.5668563	.4625719	.7860272	.93964	.34216	-.0975355	.0000001	.0000000
4	8.1558563	.6739445							
	8.2057551	.7786682	.6150995	.6216526	.38942	.85709	-.2915971	.0000000	.0000000
5	8.2618482	.8801982							
	8.3240924	.9789353	.7441793	.4461972	.83099	.55629	-.2647048	.0000001	.0000000
6	8.3916585	1.0741090							
	8.4645996	1.1662225	.8503139	.2769663	.76826	.64013	-.2773369	.0000001	.0000000
7	8.5420380	1.2545890							
	8.6241082	1.3397385	.9356762	.1245101	.70414	.72006	-.0698476	.0000001	.0000000
8	8.7099422	1.4210927							
	8.7967980	1.4967089	1.0021597	-.0043241	.64148	.76714	-.0625865	.0000001	.0000000
9	8.8865939	1.5688088							
	8.9802898	1.6383442	1.0535091	-.1098814	.58112	.81382	-.2556617	.0000001	.0000000
10	9.0764732	1.7043962							
	9.1759719	1.7676933	1.0933995	-.1955225	.52235	.85273	-.2489899	.0000001	.0000000
11	9.2775625	1.8275751							
	9.3819519	1.8846013	1.1236995	-.2627005	.46546	.88506	-.0426115	.0000000	.0000000
12	9.4880913	1.9382993							
	9.5965809	1.9890973	1.1460566	-.3134456	.41060	.91182	-.0365291	.0000001	.0000000
13	9.7065265	2.0366619							
	9.8184350	2.0813177	1.1618156	-.3498154	.35762	.93367	-.0307237	.0000001	.0000000
14	9.9315463	2.1220321							
	10.0462868	2.1614498	1.1720145	-.3736181	.30639	.95191	-.2251600	.0000000	.0000000
15	10.1620110	2.1970111							
	10.2790741	2.2296982	1.1773832	-.3962311	.25669	.96649	-.0197937	.0000001	.0000000
16	10.3969290	2.2594033							
	10.5188712	2.2862600	1.1793253	-.3884506	.20830	.97807	-.0145713	.0000000	.0000000
17	10.6354350	2.3101971							
	10.7558620	2.3313097	1.1748614	-.3802993	.16095	.98696	-.0094334	.0000001	.0000000
18	10.8767570	2.3495520							
	10.9983147	2.3649888	1.1664785	-.3605721	.11442	.99343	-.0045125	.0000000	.0000000
19	11.1201992	2.3775911							
	11.2425621	2.3873996	1.1517933	-.3266272	.06845	.99765	.0008714	-.0000000	.0000000
20	11.3651180	2.3943955							
	11.4880365	2.3981811	1.1216049	-.2579975	.02279	.99974	.0062710	.0000000	.0000000
21	11.6109999	2.4000000							
	11.7385459	2.4000000	1.0931007	-.1666174	.00000	1.00000	.0081443	.0000000	.0000000
22	11.8660920	2.4000000							
	12.0191474	2.4000000	1.0493549	-.0990481	.00000	1.00000	.0064096	.0000000	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. EF001 SCF 2

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
23	12.1722029	2.4000000							
	12.3558694	2.4000000	1.0299242	-.0607438	.072000	1.00000	.0048699	.0000000	.0000000
24	12.5395360	2.4000000							
	12.7599355	2.4000000	1.0163234	-.0329133	.000000	1.00000	.0035282	.0000000	.0000000
25	12.9803350	2.4000000							
	13.2448145	2.4000000	1.0063651	-.0127707	.000000	1.00000	.0024042	.0000000	.0000000
26	13.5692940	2.4000000							
	13.8266695	2.4000000	.9993673	.0012649	.000000	1.00000	.0015157	.0000000	.0000000
27	14.1440450	2.4000000							
	14.5258954	2.4000000	.9997837	.0104054	.000000	1.00000	.0008668	.0000000	.0000000
28	14.9057460	2.4000000							
	15.3627670	2.4000000	.9920645	.0158080	.000000	1.00000	.0004392	.0000000	.0000000
29	15.8197880	2.4000000							
	16.3242929	2.4000000	.9906911	.0185312	.000000	1.00000	.0001990	.0000000	.0000000
30	16.8287981	2.4000000							
	17.3333035	2.4000000	.9901955	.0196911	.000000	1.00000	.0000458	.0000000	.0000000
31	17.8378091	2.4000000							
	18.3423140	2.4000000	.9898734	.0201566	.000000	1.00000	.0000366	.0000000	.0000000
32	18.8468189	2.4000000							
	19.3513243	2.4000000	.9897757	.0203441	.000000	1.00000	.0000155	.0000000	.0000000
33	19.8558300	2.4000000							
	20.3603354	2.4000000	.9897375	.0204197	.000000	1.00000	.0000065	.0000000	.0000000
34	20.8648410	2.4000000							
	21.3693459	2.4000000	.9897221	.0204502	.000000	1.00000	.0000027	.0000000	.0000000
35	21.8738511	2.4000000							
	22.3783565	2.4000000	.9897159	.0204624	.000000	1.00000	.0000011	.0000000	.0000000
36	22.8828621	2.4000000							
	23.3673670	2.4000000	.9897134	.0204674	.000000	1.00000	.0000005	.0000000	.0000000
37	23.8918719	2.4000000							
	24.3963773	2.4000000	.9897125	.0204692	.000000	1.00000	.0000002	.0000000	.0000000
38	24.9008830	2.4000000							
	25.4053879	2.4000000	.9897122	.0204698	.000000	1.00000	-.0000000	.0000000	.0000000
39	25.9098930	2.4000000							
	26.4143984	2.4000000	.9897125	.0204691	.000000	1.00000	-.0000002	.0000000	.0000000
40	26.9189041	2.4000000							
	27.4234090	2.4000000	.9897137	.0204669	.000000	1.00000	-.0000004	.0000000	.0000000
41	27.9279139	2.4000000							
	28.4324193	2.4000000	.9897167	.0204609	.000000	1.00000	-.0000010	.0000000	.0000000
42	28.9369249	2.4000000							
	29.4414299	2.4000000	.9897242	.0204459	.000000	1.00000	-.0000023	.0000000	.0000000
43	29.9459350	2.4000000							
	30.4504404	2.4000000	.9897432	.0204064	.000000	1.00000	-.0000052	.0000000	.0000000
44	30.9549460	2.4000000							
	31.4594514	2.4000000	.9897901	.0203156	.000000	1.00000	-.0000113	.0000000	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE G53177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. 8F0C1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
45	31.9639571	2.4000000							
	32.4684620	2.4000000	.9899047	.0200887	.00000	1.00000	-.0000238	.0000000	.0000000
46	32.9729671	2.4000000							
	33.4774718	2.4000000	.9931768	.0195500	.00000	1.00000	-.0000473	.0000000	.0000000
47	33.9819770	2.4000000							
	34.4864821	2.4000000	.9937846	.0183458	.00000	1.00000	-.0000862	-.0000000	.0000000
48	34.9909878	2.4000000							
	35.4954939	2.4000000	.9920616	.0158138	.00000	1.00000	-.0001401	-.0000000	.0000000
49	36.0000000	2.4000000							
50	36.0000000	6.0000000							
	35.4954939	6.0000000	-.9865953	.0266297	.00000	-1.00000	.0055332	-.0000000	.0000000
51	34.9909878	6.0000000							
	34.4864821	6.0000000	-.9886103	.0226496	.00000	-1.00000	.0087381	-.0000000	.0000000
52	33.9819770	6.0000000							
	33.4774718	6.0000000	-.9893293	.0212275	.00000	-1.00000	.0114770	-.0000000	.0000000
53	32.9729671	6.0000000							
	32.4684620	6.0000000	-.9895674	.0207604	.00000	-1.00000	.0140465	-.0000000	.0000000
54	31.9639571	6.0000000							
	31.4594514	6.0000000	-.9896528	.0205873	.00000	-1.00000	.0165468	-.0000000	.0000000
55	30.9549460	6.0000000							
	30.4504404	6.0000000	-.9896872	.0205193	.00000	-1.00000	.0190187	-.0000000	.0000000
56	29.9459350	6.0000000							
	29.4414299	6.0000000	-.9897010	.0204920	.00000	-1.00000	.0214826	-.0000000	.0000000
57	28.9369249	6.0000000							
	28.4324193	6.0000000	-.9897066	.0204808	.00000	-1.00000	.0239507	-.0000000	.0000000
58	27.9279139	6.0000000							
	27.4234090	6.0000000	-.9897090	.0204762	.00000	-1.00000	.0264316	-.0000000	.0000000
59	26.9189041	6.0000000							
	26.4143984	6.0000000	-.9897098	.0204744	.00000	-1.00000	.0289318	-.0000000	.0000000
60	25.9098930	6.0000000							
	25.4053879	6.0000000	-.9897101	.0204739	.00000	-1.00000	.0314572	-.0000000	.0000000
61	24.9008830	6.0000000							
	24.3963773	6.0000000	-.9897099	.0204743	.00000	-1.00000	.0340132	-.0000000	.0000000
62	23.8918719	6.0000000							
	23.3873670	6.0000000	-.9897092	.0204756	.00000	-1.00000	.0366055	-.0000000	.0000000
63	22.8828621	6.0000000							
	22.3783565	6.0000000	-.9897074	.0204793	.00000	-1.00000	.0392402	-.0000000	.0000000
64	21.8738511	6.0000000							
	21.3693459	6.0000000	-.9897029	.0204881	.00000	-1.00000	.0419238	-.0000000	.0000000
65	20.8648410	6.0000000							
	20.3603354	6.0000000	-.9896920	.0205097	.00000	-1.00000	.0446642	-.0000000	.0000000
66	19.8558300	6.0000000							

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POTENTIAL FLOW - EDOF RELEASE 2

DATE 053177

19.3513243	6.0000000	-.9896653	.0205627	.00000	-1.00000	.0474714	-.0000000	.0000000
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POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. RFQ01 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
67	18.9468189	6.0000000							
	18.3423140	6.0000000	-.9895995	.0236929	.00000	-1.00000	.0503591	-.0000000	.3000000
68	17.8378091	6.0000000							
	17.3333035	6.0000000	-.9894367	.0213150	.00000	-1.00000	.0533491	-.0000000	.0000000
69	16.8287981	6.0000000							
	16.3242929	6.0000000	-.9890367	.0218064	.00000	-1.00000	.0564815	-.0000000	.0000000
70	15.6197880	6.0000000							
	15.3627670	6.0000000	-.9881334	.0235924	.00000	-1.00000	.0596725	-.0000000	.3000000
71	14.9057460	6.0000000							
	14.5248954	6.0000000	-.9854132	.0269890	.00000	-1.00000	.0627325	-.0000000	.0000000
72	14.1440450	6.0000000							
	13.8266695	6.0000000	-.9836181	.0324954	.00000	-1.00000	.0656290	-.0000000	.3000000
73	13.5092940	6.0000000							
	13.2448145	6.0000000	-.9795522	.0404775	.00000	-1.00000	.0684464	.0000000	.0000000
74	12.9803350	6.0000000							
	12.7599355	6.0000000	-.9741324	.0510661	.00000	-1.00000	.0712358	.0000000	.0000000
75	12.5395360	6.0000000							
	12.3558694	6.0000000	-.9673312	.0642703	.00000	-1.00000	.0740139	.0000000	.0000000
76	12.1722029	6.0000000							
	12.0191474	6.0000000	-.9589990	.0803213	.00000	-1.00000	.0767737	.0000000	.0000000
77	11.8660920	6.0000000							
	11.7385459	6.0000000	-.9472911	.1026395	.00000	-1.00000	.0795481	.0000000	.0000000
78	11.6109999	6.0000000							
	11.4849260	5.9993758	-.9332500	.1290445	-.00763	-.99997	.0837985	.0000000	.0000000
79	11.3588570	5.9980749							
	11.2336416	5.9957247	-.9237664	.1466557	-.02232	-.99975	.0885712	.0000001	.0000000
80	11.1084460	5.9924832							
	10.9840175	5.9884013	-.9202657	.1531110	-.03613	-.99935	.0924526	.0000001	.0000000
81	10.8596190	5.9834879							
	10.7359110	5.9777992	-.9187687	.1558642	-.04926	-.99880	.0956774	.0000001	.0000000
82	10.6122410	5.9713367							
	10.4891906	5.9641594	-.9188913	.1556388	-.06114	-.99813	.0980280	.0000001	.0000000
83	10.3661840	5.9562637							
	10.2437339	5.9477100	-.9202495	.1531408	-.07239	-.99738	.0997406	.0000001	.0000000
84	10.1213320	5.9384915							
	9.9994266	5.9286683	-.9226040	.1488018	-.08283	-.99656	.1007968	.0000001	.0000000
85	9.8775721	5.9182321							
	9.7561605	5.9072418	-.9257944	.1429242	-.09246	-.99572	.1012643	.0000001	.0000000
86	9.6348013	5.8956888							
	9.5138347	5.8836297	-.9297154	.1356293	-.10131	-.99485	.1012174	.0000001	.0000000
87	9.3929205	5.8710566							
	9.2723523	5.8580235	-.9343003	.1270830	-.11940	-.99400	.1007306	.0000001	.0000000
88	9.1518356	5.8445236							
	9.0316215	5.8306080	-.9395125	.1173200	-.11673	-.99316	.0998732	.0000001	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. RFQ01 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
89	8.9114568	5.8162720							
	8.7915541	5.8215628	-.9453287	.1063536	-.12332	-.99237	.0987081	.0000002	.0000000
90	8.6716980	5.7864783							
	8.5520655	5.7710621	-.9517562	.0941601	-.12918	-.99162	.0972587	.0000001	.0000000
91	8.4324759	5.7553149							
	8.3130736	5.7392761	-.9588013	.0807301	-.13432	-.99094	.0956602	.0000001	.0000000
92	8.1937102	5.7229496							
	8.0744991	5.7063711	-.9564843	.0659782	-.13876	-.99333	.0938586	.0000002	.0000000
93	7.9553225	5.6895475							
	7.8362648	5.6725104	-.9748268	.0497128	-.14250	-.98979	.0919123	.0000001	.0000000
94	7.7172364	5.6552704							
	7.5982949	5.6378548	-.9838502	.0322388	-.14555	-.98935	.0898427	.0000001	.0000000
95	7.4793769	5.6202781							
	7.3605146	5.6025631	-.9935728	.0128131	-.14791	-.98900	.0876650	.0000001	.0000000
96	7.2416701	5.5847288							
	7.1228507	5.5667928	-1.0040089	-.0040039	-.14956	-.98875	.0853398	.0000001	.0000000
97	7.0040429	5.5487792							
	6.8852304	5.5306991	-1.0151496	-.0305268	-.15058	-.98863	.0830220	.0000001	.0000000
98	6.7664229	5.5125053							
	6.6475802	5.4944441	-1.0270045	-.0547383	-.15090	-.98855	.0805707	.0000001	.0000000
99	6.5287375	5.4763030							
	6.4099034	5.4581081	-1.0395717	-.0807093	-.15054	-.98860	.0780313	.0000001	.0000000
100	6.2910579	5.4401098							
	6.1722546	5.4221053	-1.0527022	-.1083715	-.14950	-.98876	.0754726	.0000001	.0000000
101	6.0534394	5.4041809							
	5.9346336	5.3863657	-1.0666164	-.1376705	-.14779	-.98902	.0726870	.0000001	.0000000
102	5.8156097	5.3686723							
	5.6969648	5.3511245	-1.0810003	-.1685616	-.14539	-.98937	.0698812	.0000001	.0000000
103	5.5780960	5.3337401							
	5.4591755	5.3165385	-1.0958819	-.2009571	-.14231	-.98982	.0669822	.0000001	.0000000
104	5.3402255	5.2995417							
	5.2211922	5.2827654	-1.1111877	-.2347381	-.13853	-.99036	.0639973	.0000001	.0000000
105	5.1021244	5.2662359							
	4.9829406	5.2499650	-1.1268376	-.2697529	-.13406	-.99097	.0608953	.0000001	.0000000
106	4.8637178	5.2339833							
	4.7443452	5.2182993	-1.1427445	-.3058649	-.12889	-.99166	.0577055	.0000001	.0000000
107	4.6249295	5.2029475							
	4.5053288	5.1879330	-1.1588161	-.3428546	-.12300	-.99241	.0544703	.0000001	.0000000
108	4.3856817	5.1732945							
	4.2658126	5.1590343	-1.1749613	-.3805340	-.11639	-.99320	.0510435	.0000001	.0000000
109	4.1458942	5.1451945							
	4.0257148	5.1317753	-1.1910885	-.4186917	-.10975	-.99404	.0475833	.0000001	.0000000
110	3.9054843	5.1188215							
	3.7849513	5.1063317	-1.2071184	-.4571349	-.10095	-.99489	.0440515	.0000001	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2-0

2-BODY CASE NO. RFQC1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
111	3.6643663	5.0943546							
	3.5434346	5.0828863	-1.2229894	-.4957030	-.09210	-.99575	.0404649	.0000001	.0000000
112	3.4224512	5.0719786							
	3.3010736	5.0616266	-1.2386766	-.5343198	-.08248	-.99659	.0368453	.0000001	.0000000
113	3.1796457	5.0518844							
	3.0577727	5.0427473	-1.2542202	-.5733684	-.07206	-.99740	.0332187	.0000001	.0000000
114	2.9358520	5.0342705							
	2.8134310	5.0264537	-1.2697780	-.6123361	-.06084	-.99815	.0296152	.0000001	.0000000
115	2.6909667	5.0193437							
	2.5679423	5.0129486	-1.2857385	-.6531235	-.04880	-.99881	.0260688	.0000001	.0000000
116	2.4448805	5.0073232							
	2.3211935	5.0024620	-1.3029822	-.6977626	-.03592	-.99935	.0226242	.0000000	.0000000
117	2.1974770	4.9984267							
	2.0730640	4.9952242	-1.3236408	-.7520249	-.02219	-.99975	.0193530	.0000000	.0000000
118	1.9486315	4.9929024							
	1.8233214	4.9912016	-1.3635262	-.8513316	-.00759	-.99997	.0163330	.0000000	.0000000
119	1.6986000	4.9910000							
	1.6122447	4.9923773	-1.4072507	-.9803546	.02530	-.99968	.0099352	.0000000	.0000000
120	1.5265295	4.9953400							
	1.4451099	5.0004653	-1.4317451	-1.0498940	.07516	-.99717	.0002536	.0000000	.0000000
121	1.3638420	5.0076025							
	1.2867347	5.0162761	-1.4338209	-1.0558423	.12396	-.99229	-.0087796	.0000000	.0000000
122	1.2098634	5.0268385							
	1.1370124	5.0386708	-1.4251488	-1.0310490	.17254	-.98500	-.0174140	.0000000	.0000000
123	1.0644770	5.0523051							
	.9958170	5.0669729	-1.4076150	-.9813800	.22163	-.97513	-.0257855	-.0000000	.0000000
124	.9275536	5.0834259							
	.8630218	5.1037380	-1.3818800	-.9095924	.27196	-.96231	-.0340060	-.0000000	.0000000
125	.7989744	5.1197639							
	.7385202	5.1595319	-1.3477921	-.8165435	.32423	-.94598	-.0421747	-.0000002	.0000000
126	.6786504	5.1610051							
	.6222442	5.1831179	-1.3045140	-.7017567	.37921	-.92531	-.0503855	-.0000001	.0000000
127	.5665420	5.2069486							
	.5141859	5.2313510	-1.2504653	-.5636635	.43766	-.89914	-.0587268	-.0000002	.0000000
128	.4626916	5.2575035							
	.4154019	5.2836321	-1.1839759	-.4017989	.49976	-.86617	-.0671861	-.0000002	.0000000
129	.3691185	5.3114873							
	.3262277	5.3396325	-1.1022068	-.2148598	.56589	-.82448	-.0757972	-.0000002	.0000000
130	.2845438	5.3695360							
	.2462618	5.3996398	-1.0005593	-.0011188	.63658	-.77121	-.0845720	-.0000002	.0000000
131	.2094480	5.4315221							
	.1761083	5.4634883	-.8735800	.2368579	.71141	-.70277	-.0934085	-.0000002	.0000000
132	.1445518	5.4972162							
	.1176815	5.5294433	-.71886136	.4833070	.78674	-.61728	-.1017958	-.0000001	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFQC1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
133	.0927733	5.5632098							
	.0710643	5.5969337	-.5323939	.7165567	.85888	-.51218	-.1092399	-.0000001	.0000000
134	.0517239	5.6320462							
	.0356628	5.6669440	-.3070881	.9056969	.92349	-.38363	-.1151189	-.0000001	.0000000
135	.0222693	5.7029500							
	.0122057	5.7384667	-.0407090	.9983428	.97232	-.23365	-.1183271	-.0000001	.0000000
136	.0050353	5.7746781							
	.0010348	5.8072249	.2501597	.9374202	.99704	-.07683	-.1160871	-.0000001	.0000000
137	.0000000	5.8400000							
	.0027027	5.8743638	.6029925	.6364001	.98884	.14901	-.1038719	-.0000001	.0000000
138	.0102465	5.9079982							
	.0232597	5.9373533	.9503906	.0967577	.88255	.47322	-.0770077	-.0000002	.0000000
139	.0403651	5.9645276							
	.0596903	5.9879149	1.1138361	-.2406308	.73832	.67445	-.0558369	-.0000001	.0000000
140	.0812386	6.0092714							
	.1021562	6.0271011	1.1760308	-.3830484	.62532	.78037	-.0425994	-.0000001	.0000000
141	.1241154	6.0436297							
	.1491852	6.0605449	1.2014840	-.4435538	.54000	.84167	-.0339068	-.0000001	.0000000
142	.1750100	6.0762821							
	.2038299	6.0922922	1.2120775	-.4691319	.46974	.88281	-.0275121	-.0000000	.0000000
143	.2332099	6.1072499							
	.2655795	6.1224563	1.2146721	-.4754282	.41208	.91115	-.0228420	-.0000000	.0000000
144	.2983746	6.1367220							
	.3342397	6.1512396	1.2131586	-.4717537	.36425	.93130	-.0194191	-.0000000	.0000000
145	.3704374	6.1649070							
	.4098453	6.1788353	1.2095390	-.4629845	.32392	.94609	-.0169045	-.0000000	.0000000
146	.4495205	6.1919833							
	.4925903	6.2053987	1.2048752	-.4517243	.28933	.95723	-.0150646	-.0000000	.0000000
147	.5358801	6.2180863							
	.5827839	6.2310433	1.1997396	-.4393752	.25919	.96583	-.0137349	-.0000000	.0000000
148	.6298728	6.2433105							
	.6802255	6.2558419	1.1944400	-.4266868	.23251	.97259	-.0127999	.0000000	.0000000
149	.7319366	6.2677103							
	.7871896	6.2798304	1.1891464	-.4140693	.20855	.97801	-.0121747	-.0000000	.0000000
150	.8425804	6.2913041							
	.9024184	6.3030087	1.1839467	-.4017298	.18673	.98241	-.0117942	-.0000000	.0000000
151	.9623779	6.3140746							
	1.0271180	6.3253413	1.1788786	-.3897548	.16659	.98603	-.0116067	-.0000000	.0000000
152	1.0919561	6.3359682							
	1.1619567	6.3467551	1.1739498	-.3781582	.14773	.98903	-.0115676	.0000000	.0000000
153	1.2320445	6.3568918							
	1.3076668	6.3671342	1.1691399	-.3668862	.12982	.99154	-.0116357	-.0000000	.0000000
154	1.3833770	6.3767059							
	1.4650454	6.3863122	1.1644032	-.3558349	.11254	.99365	-.0117698	-.0000000	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. RFOC1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	II	CP	SIN A	COS A	SIGMA	N	PHI
155	1.5467935	6.3952146							
	1.6349574	6.4040560	1.1596567	-.3448021	.39555	.99542	-.0119235	-.0000000	.0000000
156	1.7231938	6.4121470							
	1.8183392	6.4200526	1.1547462	-.3324388	.37846	.99692	-.0120423	-.0000000	.0000000
157	1.9135580	6.4271276							
	2.0162014	6.4338492	1.1493931	-.3211044	.36071	.99816	-.0120487	-.0000000	.0000000
158	2.1189137	6.4396189							
	2.2296323	6.4447989	1.1430560	-.3065770	.34138	.99914	-.0118022	-.0000000	.0000000
159	2.3404030	6.4487910							
	2.4606907	6.4515117	1.1296806	-.2761784	.31749	.99985	-.0109024	-.0000000	.0000000
160	2.5810000	6.4530000							
	2.7100000	6.4530000	1.1048596	-.2207146	.28000	1.00000	-.0114493	-.0000001	.0000000
161	2.8390000	6.4530000							
	2.9680000	6.4530000	1.0829748	-.1728345	.25000	1.00000	-.0149346	-.0000001	.0000000
162	3.0970000	6.4530000							
	3.2260000	6.4530000	1.0714438	-.1479917	.22000	1.00000	-.0181945	-.0000001	.0000000
163	3.3550000	6.4530000							
	3.4839999	6.4530000	1.0629126	-.1297832	.20000	1.00000	-.0213197	-.0000001	.0000000
164	3.6129999	6.4530000							
	3.7419999	6.4530000	1.0562431	-.1156495	.20000	1.00000	-.0243565	-.0000001	.0000000
165	3.8709999	6.4530000							
	3.9999999	6.4530000	1.0508351	-.1042544	.20000	1.00000	-.0273346	-.0000001	.0000000
166	4.1289999	6.4530000							
	4.2579998	6.4530000	1.0463384	-.0940240	.20000	1.00000	-.0302734	-.0000001	.0000000
167	4.3869998	6.4530000							
	4.5159998	6.4530000	1.0425292	-.0866671	.20000	1.00000	-.0331960	-.0000001	.0000000
168	4.6449998	6.4530000							
	4.7739998	6.4530000	1.0392553	-.0800515	.20000	1.00000	-.0360912	-.0000001	.0000000
169	4.9029998	6.4530000							
	5.0319998	6.4530000	1.0364082	-.0741423	.20000	1.00000	-.0389649	-.0000001	.0000000
170	5.1609997	6.4530000							
	5.2899997	6.4530000	1.0339083	-.0689664	.20000	1.00000	-.0418410	-.0000002	.0000000
171	5.4189997	6.4530000							
	5.5479996	6.4530000	1.0316951	-.0643948	.20000	1.00000	-.0447120	-.0000002	.0000000
172	5.6769996	6.4530000							
	5.8059996	6.4530000	1.0297217	-.0603268	.20000	1.00000	-.0475791	-.0000003	.0000000
173	5.9349996	6.4530000							
	6.0639995	6.4530000	1.0279514	-.0566840	.20000	1.00000	-.0504427	-.0000003	.0000000
174	6.1929995	6.4530000							
	6.3219995	6.4530000	1.0263546	-.0534337	.20000	1.00000	-.0533019	-.0000003	.0000000
175	6.4509995	6.4530000							
	6.5799995	6.4530000	1.0249073	-.0504350	.20000	1.00000	-.0561547	-.0000003	.0000000
176	6.7089995	6.4530000							
	6.8379995	6.4530000	1.0235901	-.0477367	.20000	1.00000	-.0589975	-.0000003	.0000000

POTENTIAL FLOW - BODY RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
177	6.9669994	6.4530000							
	7.0959994	6.4530000	1.0223863	-.0452738	.00000	1.00000	-.0618242	-.0000003	.0000000
178	7.2249994	6.4530000							
	7.3539994	6.4530000	1.0212823	-.0430176	.00000	1.00000	-.0646264	-.0000003	.0000000
179	7.4829993	6.4530000							
	7.6119993	6.4530000	1.0202672	-.0409447	.00000	1.00000	-.0673915	-.0000004	.0000000
180	7.7409993	6.4530000							
	7.8699992	6.4530000	1.0193301	-.0390339	.00000	1.00000	-.0701023	-.0000003	.0000000
181	7.9989992	6.4530000							
	8.1279991	6.4530000	1.0184639	-.0372686	.00000	1.00000	-.0727359	-.0000003	.0000000
182	8.2569991	6.4530000							
	8.3859991	6.4530000	1.0176601	-.0356321	.00000	1.00000	-.0752621	-.0000003	.0000000
183	8.5149990	6.4530000							
	8.6439990	6.4530000	1.0169132	-.0341124	.00000	1.00000	-.0776425	-.0000004	.0000000
184	8.7729989	6.4530000							
	8.9019989	6.4530000	1.0162173	-.0326977	.00000	1.00000	-.0798296	-.0000004	.0000000
185	9.0309988	6.4530000							
	9.1599988	6.4530000	1.0155673	-.0313769	.00000	1.00000	-.0817658	-.0000004	.0000000
186	9.2889987	6.4530000							
	9.4179987	6.4530000	1.0149565	-.0301408	.00000	1.00000	-.0833846	-.0000004	.0000000
187	9.5469986	6.4530000							
	9.6759986	6.4530000	1.0143471	-.0289811	.00000	1.00000	-.0846112	-.0000004	.0000000
188	9.8049985	6.4530000							
	9.9339982	6.4530000	1.0138490	-.0278898	.00000	1.00000	-.0853670	-.0000004	.0000000
189	10.0629981	6.4530000							
	10.1919980	6.4530000	1.0133399	-.0268577	.00000	1.00000	-.0855748	-.0000004	.0000000
190	10.3209980	6.4530000							
	10.4499979	6.4530000	1.0128576	-.0258804	.00000	1.00000	-.0851681	-.0000005	.0000000
191	10.5789978	6.4530000							
	10.7079977	6.4530000	1.0123975	-.0249486	.00000	1.00000	-.0841034	-.0000005	.0000000
192	10.8369976	6.4530000							
	10.9659975	6.4530000	1.0119528	-.0240485	.00000	1.00000	-.0823770	-.0000005	.0000000
193	11.0949974	6.4530000							
	11.2239973	6.4530000	1.0115052	-.0231425	.00000	1.00000	-.0809536	-.0000005	.0000000
194	11.3529972	6.4530000							
	11.4819971	6.4530000	1.0110899	-.0222404	.00000	1.00000	-.0773275	-.0000004	.0000000
195	11.6109970	6.4530000							
	11.7399969	6.4530000	1.0107809	-.0213403	.00000	1.00000	-.0745566	-.0000005	.0000000
196	11.8690000	6.4530000							
	12.0000000	6.4530000	1.0104849	-.0204402	.00000	1.00000	-.0718294	-.0000004	.0000000
197	12.1786000	6.4530000							
	12.3643600	6.4530000	1.0100852	-.0195401	.00000	1.00000	-.0690987	-.0000004	.0000000
198	12.5501200	6.4530000							
	12.7730319	6.4530000	1.0096146	-.0193215	.00000	1.00000	-.0663748	-.0000005	.0000000

POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFQC1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
199	12.9959440	6.4530000							
	13.2634380	6.4530000	1.0090960	-.0182746	.00000	1.00000	-.0636837	-.0000004	.0000000
200	13.5309319	6.4530000							
	13.8519255	6.4530000	1.0085308	-.0171343	.00000	1.00000	-.0609909	-.0000004	.0000000
201	14.1729190	6.4530000							
	14.5581110	6.4530000	1.0079207	-.0159042	.00000	1.00000	-.0582431	-.0000005	.0000000
202	14.9433030	6.4530000							
	15.4055330	6.4530000	1.0072711	-.0145950	.00000	1.00000	-.0553561	-.0000004	.0000000
213	15.8677630	6.4530000							
	16.3710690	6.4530000	1.0066237	-.0132912	.00000	1.00000	-.0523765	-.0000003	.0000000
204	16.8743751	6.4530000							
	17.3776810	6.4530000	1.0060465	-.0121295	.00000	1.00000	-.0494739	-.0000003	.0000000
205	17.8809869	6.4530000							
	18.3842928	6.4530000	1.0055537	-.0111382	.00000	1.00000	-.0467040	-.0000003	.0000000
206	18.8875990	6.4530000							
	19.3909049	6.4530000	1.0051265	-.0102832	.00000	1.00000	-.0440289	-.0000003	.0000000
207	19.8942111	6.4530000							
	20.3975165	6.4530000	1.0047592	-.0095410	.00000	1.00000	-.0414280	-.0000003	.0000000
208	20.9008219	6.4530000							
	21.4041278	6.4530000	1.0044375	-.0088946	.00000	1.00000	-.0388887	-.0000003	.0000000
209	21.9074340	6.4530000							
	22.4107399	6.4530000	1.0041568	-.0083309	.00000	1.00000	-.0364016	-.0000002	.0000000
210	22.9140460	6.4530000							
	23.4173520	6.4530000	1.0039126	-.0078405	.00000	1.00000	-.0339597	-.0000002	.0000000
211	23.9206581	6.4530000							
	24.4239640	6.4530000	1.0037013	-.0074163	.00000	1.00000	-.0315566	-.0000002	.0000000
212	24.9272699	6.4530000							
	25.4305758	6.4530000	1.0035207	-.0070537	.00000	1.00000	-.0291870	-.0000002	.0000000
213	25.9338820	6.4530000							
	26.4371874	6.4530000	1.0033696	-.0067506	.00000	1.00000	-.0268456	-.0000002	.0000000
214	26.9404931	6.4530000							
	27.4437990	6.4530000	1.0032484	-.0065074	.00000	1.00000	-.0245274	-.0000002	.0000000
215	27.9471049	6.4530000							
	28.4504108	6.4530000	1.0031592	-.0063284	.00000	1.00000	-.0222271	-.0000002	.0000000
216	28.9537170	6.4530000							
	29.4570229	6.4530000	1.0031068	-.0062233	.00000	1.00000	-.0199384	-.0000002	.0000000
217	29.9603291	6.4530000							
	30.4636350	6.4530000	1.0031011	-.0062118	.00000	1.00000	-.0176536	-.0000001	.0000000
218	30.9669411	6.4530000							
	31.4702466	6.4530000	1.0031608	-.0063315	.00000	1.00000	-.0153615	-.0000001	.0000000
219	31.9735520	6.4530000							
	32.4768577	6.4530000	1.0033257	-.0066624	.00000	1.00000	-.0130429	-.0000001	.0000000
220	32.9801641	6.4530000							
	33.4834700	6.4530000	1.0036948	-.0074032	.00000	1.00000	-.0106599	-.0000001	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

ON-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
221	33.9867759	6.4530000							
	34.4900818	6.4530000	1.0045893	-.0091996	.00000	1.00000	-.0061195	-.0000000	.0000000
222	34.9933882	6.4530000							
	35.4966941	6.4530000	1.0068482	-.0137433	.00000	1.00000	-.0051480	-.0000000	.0000000
223	36.0000000	6.4530000							
ADDED MASS =			.0000000	VOLUME =	1335.0865936	SUM (TI) (DELTA S) =		28.6915860	

POTENTIAL FLOW - CODE RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.2

Z-BODY CASE NO. BF001 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
1	8.0110000	.0000000							
	8.0152085	.1151024	1.3431453	-.8040259	.99742	.87174	2.9175955	-.0000012	.0000000
2	8.0275149	.2296225							
	8.0402578	.3442699	-.2379532	.9433783	.97723	.21217	1.8797340	-.0000033	.0000000
3	8.0769252	.4571068							
	8.1128740	.5668563	.0173212	.9997007	.93954	.34216	1.4328921	-.0000004	.0000000
4	8.1558563	.6739545							
	8.2057551	.7786680	.0420797	.9982293	.85942	.45709	1.1590825	-.0000007	.0000000
5	8.2618482	.8801082							
	8.3240924	.9789352	.0541076	.9970724	.83099	.55629	.9668429	-.0000011	.0000000
6	8.3916585	1.0791092							
	8.4645996	1.1662225	.0622022	.9961309	.76826	.64013	.8218058	-.0000017	.0000000
7	8.5420380	1.2545893							
	8.6241082	1.3397385	.0693662	.9953258	.70414	.71006	.7069110	-.0000001	.0000000
8	8.7099422	1.4210927							
	8.7967980	1.4967089	.0728940	.9946865	.64148	.76714	.6138926	-.0000004	.0000000
9	8.8865939	1.5688088							
	8.9802898	1.6383442	.0763558	.9941698	.56112	.81382	.5359773	.0000001	.0000000
10	9.0764732	1.7043962							
	9.1759719	1.7676933	.0790533	.9937506	.52235	.85273	.4677701	-.0000002	.0000000
11	9.2775625	1.8275751							
	9.3819519	1.8846010	.0811404	.9934162	.46548	.88506	.4070175	-.0000005	.0000000
12	9.4880913	1.9382993							
	9.5965809	1.9890973	.0827026	.9931603	.41060	.91182	.3520244	.0000000	.0000000
13	9.7065265	2.0366619							
	9.8184350	2.0813177	.0838335	.9929719	.35762	.93387	.3015096	-.0000001	.0000000
14	9.9315463	2.1228321							
	10.0462868	2.1614498	.0846025	.9928424	.30639	.95191	.2544692	-.0000002	.0000000
15	10.1620110	2.1970111							
	10.2790741	2.2296982	.0850782	.9927617	.25669	.96649	.2101040	-.0000003	.0000000
16	10.3969290	2.2594733							
	10.5156712	2.2862602	.0853094	.9927223	.20830	.97807	.1677446	-.0000003	.0000000
17	10.6354350	2.3101971							
	10.7558620	2.3313297	.0853679	.9927123	.16095	.98696	.1268158	.0000004	.0000000
18	10.8767570	2.3495523							
	10.9983147	2.3649888	.0854064	.9927057	.11442	.99343	.0867941	.0000001	.0000000
19	11.1201990	2.3775911							
	11.2425621	2.3873995	.08567395	.9927463	.06845	.99765	.0471027	-.0000000	.0000000
20	11.3651180	2.3943955							
	11.4880365	2.3981811	.0856019	.9935033	.02279	.99974	.0071924	.0000000	.0000000
21	11.6109999	2.4000000							
	11.7385459	2.4000000	.0517819	.9973186	.00000	1.00000	-.0115786	-.0000001	.0000000
22	11.8660920	2.4000000							
	12.0191474	2.4000000	.0748328	.9944001	.00000	1.00000	-.0085925	-.0000000	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF001 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	H	PHI
23	12.1722229	2.4000000							
	12.3558694	2.4000000	.0733364	.9946218	.00000	1.00000	-.2060584	-.0000000	.0000000
24	12.5395360	2.4000000							
	12.7599355	2.4000000	.0726524	.9947289	.00000	1.00000	-.0039986	-.0000000	.0000000
25	12.9803350	2.4000000							
	13.2448195	2.4000000	.0720483	.9948091	.00000	1.00000	-.0024356	-.0000000	.0000000
26	13.5092940	2.4000000							
	13.8266695	2.4000000	.0716404	.9948677	.00000	1.00000	-.0013456	-.0000000	.0000000
27	14.1440450	2.4000000							
	14.5248954	2.4000000	.0713587	.9949379	.00000	1.00000	-.0006606	-.0000000	.0000000
28	14.9057460	2.4000000							
	15.3627670	2.4000000	.0711754	.9949341	.00000	1.00000	-.0002810	-.0000000	.0000000
29	15.8197880	2.4000000							
	16.3242929	2.4000000	.0710646	.9949498	.00000	1.00000	-.0001053	.0000000	.0000000
30	16.8247981	2.4000000							
	17.3333335	2.4000000	.0710125	.9949572	.00000	1.00000	-.0000375	-.0000000	.0000000
31	17.8378991	2.4000000							
	18.3423140	2.4000000	.0709912	.9949603	.00000	1.00000	-.0000132	.0000000	.0000000
32	18.8468189	2.4000000							
	19.3513243	2.4000000	.0709935	.9949614	.00000	1.00000	-.0000249	.0000000	.0000000
33	19.8556300	2.4000000							
	20.3603354	2.4000000	.0709912	.9949617	.00000	1.00000	-.0000019	.0000000	.0000000
34	20.8648410	2.4000000							
	21.3693459	2.4000000	.0709902	.9949618	.00000	1.00000	-.0000014	.0000000	.0000000
35	21.8738511	2.4000000							
	22.3783565	2.4000000	.0709933	.9949614	.00000	1.00000	-.0000022	.0000000	.0000000
36	22.8828621	2.4000000							
	23.3873670	2.4000000	.0709896	.9949605	.00000	1.00000	-.0000050	.0000000	.0000000
37	23.8918719	2.4000000							
	24.3963773	2.4000000	.0710084	.9949578	.00000	1.00000	-.0000127	.0000000	.0000000
38	24.9018830	2.4000000							
	25.4053879	2.4000000	.0710577	.9949509	.00000	1.00000	-.0000313	.0000000	.0000000
39	25.9098930	2.4000000							
	26.4143984	2.4000000	.0711789	.9949336	.00000	1.00000	-.0000779	.0000000	.0000000
40	26.9189041	2.4000000							
	27.4234090	2.4000000	.0714939	.9948901	.00000	1.00000	-.0001942	.0000000	.0000000
41	27.9279139	2.4000000							
	28.4324193	2.4000000	.0722369	.9947818	.00000	1.00000	-.0004847	-.0000000	.0000000
42	28.9369249	2.4000000							
	29.4414299	2.4000000	.0740024	.9945103	.00000	1.00000	-.0012093	-.0000000	.0000000
43	29.9459350	2.4000000							
	30.4504404	2.4000000	.0766858	.9938086	.00000	1.00000	-.0030227	-.0000000	.0000000
44	30.9549460	2.4000000							
	31.4594514	2.4000000	.0901115	.9918799	.00000	1.00000	-.0075709	-.0000000	.0000000

POTENTIAL FLOW - CODE RELEASE 2

DATE 353177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF001 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
45	31.9639571	2.4000000							
	32.4684620	2.4000000	.1187749	.9858925	.00000	1.00000	-.0190362	-.0000002	.0000000
46	32.9729671	2.4000000							
	33.4774718	2.4000000	.1922080	.9630561	.30000	1.00000	-.0483782	-.0000001	.0000000
47	33.9819770	2.4000000							
	34.4864821	2.4000000	.3381897	.8856277	.00000	1.00000	-.1272476	-.0000003	.0000000
48	34.9909878	2.4000000							
	35.4954939	2.4000000	1.8657461	-2.4810086	.00000	1.00000	-.4055443	-.0000007	.0000000
49	36.0000000	2.4000000							
50	36.0000000	6.0000000							
	35.4954939	6.0000000	.3466245	.8793515	.00000	-1.00000	.2449708	.0000000	.0000000
51	34.9909878	6.0000000							
	34.4864821	6.0000000	.1138731	.9858644	.00000	-1.00000	.3224441	.0000002	.0000000
52	33.9819770	6.0000000							
	33.4774718	6.0000000	.0088481	.9999217	.00000	-1.00000	.3554771	.0000002	.0000000
53	32.9729671	6.0000000							
	32.4684620	6.0000000	-.0378332	.9985687	.30000	-1.00000	.3686712	.0000002	.0000000
54	31.9639571	6.0000000							
	31.4594514	6.0000000	-.0573428	.9967118	.00000	-1.00000	.3724831	.0000000	.0000000
55	30.9549460	6.0000000							
	30.4504404	6.0000000	-.0553902	.9957241	.00000	-1.00000	.3714600	.0000000	.0000000
56	29.9459350	6.0000000							
	29.4414299	6.0000000	-.0686852	.9952824	.00000	-1.00000	.3676856	-.0000001	.0000000
57	28.9369249	6.0000000							
	28.4324193	6.0000000	-.0700312	.9950956	.00000	-1.00000	.3621781	.0000002	.0000000
58	27.9279139	6.0000000							
	27.4234090	6.0000000	-.0705807	.9950184	.30000	-1.00000	.3554710	.0000000	.0000000
59	26.9189041	6.0000000							
	26.4143984	6.0000000	-.0718054	.9949866	.00000	-1.00000	.3478755	-.0000000	.0000000
60	25.9098930	6.0000000							
	25.4053879	6.0000000	-.0708994	.9949733	.00000	-1.00000	.3395867	-.0000001	.0000000
61	24.9008830	6.0000000							
	24.3963773	6.0000000	-.0709394	.9949676	.00000	-1.00000	.3307377	-.0000000	.0000000
62	23.8918719	6.0000000							
	23.3873670	6.0000000	-.0709578	.9949650	.00000	-1.00000	.3214250	-.0000002	.0000000
63	22.8828621	6.0000000							
	22.3783565	6.0000000	-.0709658	.9949639	.30000	-1.00000	.3117216	-.0000001	.0000000
64	21.8738511	6.0000000							
	21.3693459	6.0000000	-.0709702	.9949632	.00000	-1.00000	.3016841	.0000000	.0000000
65	20.8648410	6.0000000							
	20.3603354	6.0000000	-.0709724	.9949629	.00000	-1.00000	.2913577	-.0000001	.0000000
66	19.8558300	6.0000000							

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

19.3513243 6.0000000

-.3739725

.9999529

.00000

-1.00000

.2807788

-.0000001

.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-800Y CASE NO. BF001 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
67	16.8468189	6.0000000	-.0709706	.9949632	.000000	-1.000000	.2699774	-.0000001	.0000000
68	12.3423140	6.0000000	-.0709620	.9949644	.000000	-1.000000	.2589781	-.0000000	.0000000
69	17.3333035	6.0000000	-.0709602	.9949675	.000000	-1.000000	.2478927	.0000000	.0000000
70	16.8287981	6.0000000	-.0708885	.9949748	.000000	-1.000000	.2370977	-.0000001	.0000000
71	16.3242929	6.0000000	-.0707858	.9949894	.000000	-1.000000	.2275006	-.0000001	.0000000
72	15.8197880	6.0000000	-.0706158	.9950134	.000000	-1.000000	.2195200	.0000000	.0000000
73	15.3627670	6.0000000	-.0704884	.9950484	.000000	-1.000000	.2128412	.0000001	.0000000
74	14.9057460	6.0000000	-.070341	.9950952	.000000	-1.000000	.2072669	.0000000	.0000000
75	14.5248954	6.0000000	-.0696086	.9951546	.000000	-1.000000	.2026281	.0000000	.0000000
76	14.1440450	6.0000000	-.0690068	.9952321	.000000	-1.000000	.1988004	.0000001	.0000000
77	13.8266695	6.0000000	-.0688061	.9952657	.000000	-1.000000	.1958302	.0000001	.0000000
78	13.5092945	6.0000000	-.0669228	.9955214	-.00763	-.99997	.1927370	.0000001	.0000000
79	13.2446145	6.0000000	-.0655741	.9957000	-.02232	-.99975	.1899037	.0000001	.0000000
80	12.9603350	6.0000000	-.0660531	.9956370	-.03613	-.99935	.1842953	.0000001	.0000000
81	12.7599355	6.0000000	-.0660925	.9956318	-.06114	-.99813	.1702914	.0000000	.0000000
82	12.5395360	6.0000000	-.0662436	.9956118	-.07239	-.99738	.1624530	.0000000	.0000000
83	12.3558694	6.0000000	-.0664616	.9955829	-.08283	-.99656	.1543663	.0000001	.0000000
84	12.1722029	6.0000000	-.06670596	.9955030	-.10131	-.99485	.1381703	.0000000	.0000000
85	12.0191474	6.0000000	-.0674286	.9954534	-.10940	-.99400	.1303261	-.0000000	.0000000
86	11.9660920	6.0000000	-.0678400	.9953977	-.11673	-.99316	.1227705	.0000000	.0000000
87	11.7385459	6.0000000							
88	11.6109999	6.0000000							
89	11.4849260	5.9993703							
90	11.3588570	5.9980749							
91	11.2336416	5.9957247							
92	11.1084460	5.9924832							
93	10.9840175	5.9884013							
94	10.8596190	5.9834879							
95	10.7359110	5.9777092							
96	10.6122410	5.9713367							
97	10.4891906	5.9641594							
98	10.3661840	5.9562637							
99	10.2437339	5.9477100							
100	10.1213320	5.9384915							
101	9.9994266	5.9286683							
102	9.8775721	5.9182321							
103	9.7561605	5.9072418							
104	9.6348013	5.8956808							
105	9.5138347	5.8836297							
106	9.3929205	5.8710563							
107	9.2723523	5.8580235							
108	9.1518356	5.8445236							
109	9.0316215	5.8306080							

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
89	8.9114568	5.8162723	-.0682916	.9953363	-.12332	-.99237	.1155574	.0000001	.0000000
	8.7915541	5.8015628							
90	8.6716980	5.7864783	-.0697868	.9952684	-.12918	-.99162	.1087187	-.0000000	.0000000
	8.5520655	5.7710621							
91	8.4324759	5.7553149	-.0693234	.9951943	-.13432	-.99094	.1022685	-.0000000	.0000000
	8.3130736	5.7392761							
92	8.1937102	5.7229496	-.0699047	.9951133	-.13876	-.99033	.0962083	-.0000000	.0000000
	8.0744991	5.7063711							
93	7.9553225	5.6895475	-.0705332	.9950251	-.14250	-.98979	.0905303	-.0000000	.0000000
	7.8362648	5.6725104							
94	7.7172364	5.6552704	-.0712099	.9949292	-.14555	-.98935	.0852203	-.0000000	.0000000
	7.5982949	5.6378548							
95	7.4793769	5.6202781	-.0719362	.9948252	-.14791	-.98900	.0802599	-.0000000	.0000000
	7.3605146	5.6025631							
96	7.2416701	5.5847288	-.0727153	.9947125	-.14958	-.98875	.0756281	-.0000000	.0000000
	7.1228537	5.5667928							
97	7.0040429	5.5487792	-.0735358	.9945925	-.15058	-.98863	.0712019	-.0000000	.0000000
	6.8852304	5.5306991							
98	6.7664229	5.5125853	-.0744106	.9944631	-.15090	-.98855	.0672640	-.0000001	.0000000
	6.6475802	5.4944441							
99	6.5287375	5.4763033	-.0753539	.9943218	-.15054	-.98863	.0634882	-.0000001	.0000000
	6.4099004	5.4581881							
100	6.2910579	5.4401098	-.0763430	.9941718	-.14950	-.98876	.0599536	-.0000001	.0000000
	6.1722546	5.4221053							
101	6.0534394	5.4041809	-.0773721	.9940136	-.14779	-.98902	.0566435	-.0000001	.0000000
	5.9346336	5.3863657							
102	5.8158097	5.3686723	-.0784452	.9938464	-.14539	-.98937	.0535375	-.0000001	.0000000
	5.6969648	5.3511245							
103	5.5780960	5.3337401	-.0795596	.9936703	-.14231	-.98982	.0506170	-.0000000	.0000000
	5.4591745	5.3165385							
104	5.3402255	5.2995417	-.0807107	.9934852	-.13853	-.99036	.0476647	-.0000001	.0000000
	5.2211922	5.2827654							
105	5.1021244	5.2662359	-.0818943	.9932933	-.13406	-.99097	.0445250	-.0000000	.0000000
	4.9829406	5.2499650							
106	4.8637178	5.2339833	-.0831073	.9930932	-.12889	-.99166	.0428034	-.0000001	.0000000
	4.7443452	5.2182993							
107	4.6249295	5.2029475	-.0843447	.9928960	-.12300	-.99241	.0404665	-.0000001	.0000000
	4.5053288	5.1879330							
108	4.3856817	5.1732945	-.0856244	.9926719	-.11639	-.99320	.0382422	-.0000001	.0000000
	4.2658126	5.1590343							
109	4.1458942	5.1451945	-.0868839	.9924512	-.10905	-.99404	.0361198	-.0000001	.0000000
	4.0257148	5.1317750							
110	3.9054843	5.1188215	-.0881841	.9922236	-.10095	-.99489	.0340895	-.0000000	.0000000
	3.7849513	5.1063717							

POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TLST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	II	CP	SIN A	COS A	SIGMA	N	PHI
111	3.6643663	5.0943545							
	3.5434346	5.0828863	-.0895079	.9919883	-.09210	-.99575	.0321430	-.0000001	.0000000
112	3.4224512	5.0719785							
	3.3010736	5.0616266	-.0908643	.9917437	-.09298	-.99659	.0302730	-.0000001	.0000000
113	3.1796457	5.0519844							
	3.0577727	5.0427473	-.0922712	.9914860	-.07206	-.99740	.0284733	-.0000001	.0000000
114	2.9358520	5.0342735							
	2.8134310	5.0264507	-.0937601	.9912090	-.06084	-.99815	.0267381	-.0000000	.0000000
115	2.6979667	5.0193437							
	2.5679423	5.0129486	-.0953894	.9909309	-.04880	-.99881	.0250603	-.0000000	.0000000
116	2.4448805	5.0073202							
	2.3211935	5.0024623	-.0972663	.9905393	-.03592	-.99935	.0234279	-.0000000	.0000000
117	2.1974770	4.9984267							
	2.0730640	4.9952242	-.0997472	.9900505	-.02219	-.99975	.0218179	-.0000001	.0000000
118	1.9485315	4.9929024							
	1.8233214	4.9912016	-.1034009	.9893083	-.00759	-.99997	.0200782	-.0000001	.0000000
119	1.5980000	4.9910000							
	1.6122447	4.9923773	-.1082888	.9882735	.02530	-.99968	.0181800	-.0000001	.0000000
120	1.5265295	4.9953400							
	1.4451099	5.0004653	-.1119785	.9874608	.07516	-.99717	.0165330	-.0000000	.0000000
121	1.3638420	5.0076025							
	1.2867347	5.0162761	-.1137516	.9870606	.12396	-.99229	.0152464	-.0000000	.0000000
122	1.2098634	5.0263385							
	1.1370124	5.0386708	-.1152594	.9867153	.17254	-.98500	.0141029	-.0000000	.0000000
123	1.0644770	5.0523051							
	.9958175	5.0669929	-.1165245	.9864221	.22163	-.97513	.0130561	.0000000	.0000000
124	.9275536	5.0834258							
	.8630218	5.1007380	-.1176746	.9861527	.27196	-.96231	.0120750	.0000000	.0000000
125	.7989744	5.1197639							
	.7385202	5.1395319	-.1187964	.9858874	.32423	-.94598	.0111366	.0000000	.0000000
126	.6785504	5.1610051							
	.6222442	5.1831179	-.1199546	.9856109	.37921	-.92531	.0102212	-.0000000	.0000000
127	.5665420	5.2069486							
	.5141859	5.2313510	-.1211963	.9853115	.43766	-.89914	.0093101	.0000000	.0000000
128	.4626816	5.2575035							
	.4154019	5.2836321	-.1225363	.9849849	.49976	-.86617	.0083929	.0000000	.0000000
129	.3691185	5.3114873							
	.3262277	5.3396325	-.1239588	.9846342	.56589	-.82448	.0074515	.0000000	.0000000
130	.2845438	5.3695360							
	.2462618	5.3996398	-.1254130	.9842716	.63658	-.77121	.0064618	.0000000	.0000000
131	.2094480	5.4315221							
	.1761083	5.4634883	-.1267736	.9839285	.71141	-.70277	.0054004	.0000000	.0000000
132	.1445518	5.4972162							
	.1176815	5.5294433	-.1277687	.9836752	.78674	-.61728	.0042798	.0000000	.0000000

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POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
133	.0927733	5.5632598	-.1290763	.9835965	.85888	-.51218	.0030997	.0000001	.6000000
	.0710843	5.5969337							
134	.0517239	5.6320462	-.1273103	.9837921	.92349	-.38363	.0018624	.0000001	.0000000
	.0356628	5.6669440							
135	.0222693	5.7029530	-.1252442	.9843139	.97232	-.23365	.0006470	.0000001	.0000000
	.0122057	5.7384667							
136	.0050333	5.7746781	-.1243463	.9845380	.99704	-.07683	-.0003345	.0000000	.0000000
	.0010348	5.8072249							
137	.0000000	5.8400000	-.1247120	.9844469	.98884	.14901	-.0020998	.0000001	.0000000
	.0027027	5.8743638							
138	.0102465	5.9079982	-.1133500	.9871518	.88255	.47022	-.0055131	.0000000	.0000000
	.0232597	5.9373530							
139	.0403651	5.9645275	-.0937994	.9912017	.73832	.67445	-.0077592	-.0000000	.0000000
	.0596903	5.9879149							
140	.0812386	6.0092714	-.0777310	.9939579	.62532	.78037	-.0089678	.0000000	.0000000
	.1021562	6.0271011							
141	.1241164	6.0436297	-.0655020	.9957095	.54000	.84167	-.0096896	-.0000000	.0000000
	.1491852	6.0605449							
142	.1750130	6.0752820	-.0555214	.9969174	.46974	.86281	-.0102362	.0000000	.0000000
	.2038299	6.0922922							
143	.2332099	6.1072499	-.0474323	.9977502	.31208	.91115	-.0106063	-.0000000	.0000000
	.2655795	6.1224563							
144	.2983746	6.1367220	-.0408207	.9983337	.36425	.93130	-.0109424	.0000000	.0000000
	.3342397	6.1512396							
145	.3704374	6.1649070	-.0353480	.9987505	.32392	.94609	-.0112472	-.0000000	.0000000
	.4098453	6.1788353							
146	.4495205	6.1918300	-.0307569	.9990540	.28933	.95723	-.0115415	.0000000	.0000000
	.4925903	6.2053987							
147	.5358801	6.2180863	-.0268558	.9992788	.25919	.96583	-.0118393	.0000000	.0000000
	.5827839	6.2310433							
148	.6298728	6.2433105	-.0235028	.9994476	.23251	.97259	-.0121512	.0000000	.0000000
	.6808255	6.2558419							
149	.7319366	6.2677103	-.0205918	.9995760	.20855	.97801	-.0124856	.0000000	.0000000
	.7871896	6.2798304							
150	.8425804	6.2913041	-.0180419	.9996745	.18673	.98241	-.0128500	.0000000	.0000000
	.9024184	6.3030087							
151	.9623779	6.3140746	-.0157910	.9997506	.16659	.98603	-.0132514	.0000001	.0000000
	1.0271180	6.3253413							
152	1.0919661	6.3359682	-.0137909	.9998098	.14773	.98903	-.0136970	.0000000	.0000000
	1.1619567	6.3467551							
153	1.2320445	6.3568918	-.0120026	.9998560	.12982	.99154	-.0141944	.0000000	.0000000
	1.3076668	6.3671342							
154	1.3833770	6.3767059	-.0103956	.9998919	.11254	.99365	-.0147516	.0000000	.0000000
	1.4650454	6.3863122							

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFOC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
155	1.5467935	6.3952146							
	1.6349574	6.4640580	-.0389445	.9999230	.09555	.99542	-.0153780	.0000000	.3306000
156	1.7231938	6.4121470							
	1.8183392	6.4200526	-.0376292	.9999418	.07846	.99692	-.0150850	.0000000	.3000000
157	1.9135560	6.4271276							
	2.0162014	6.4338492	-.0364275	.9999587	.06071	.99816	-.0168878	.0000000	.2000000
158	2.1189107	6.4396189							
	2.2296323	6.4447989	-.0054554	.9999702	.04138	.99914	-.0178062	.0000000	.1000000
159	2.3404330	6.4487913							
	2.4606907	6.4515117	-.0044676	.9999830	.031749	.99985	-.0189796	.0000000	.0000000
160	2.5810000	6.4530000							
	2.7100000	6.4530000	-.0330476	.9999905	.00000	1.00000	-.0206284	.0000000	.0000000
161	2.8390000	6.4530000							
	2.9680000	6.4530000	-.0324725	.9999939	.00000	1.00000	-.0222813	.0000000	.0000000
162	3.0970000	6.4530000							
	3.2260000	6.4530000	-.0017980	.9999962	.00000	1.00000	-.0239276	.0000000	.0000000
163	3.3550000	6.4530000							
	3.4839999	6.4530000	-.0012256	.9999985	.00000	1.00000	-.0256285	.0000000	.0000000
164	3.6129999	6.4530000							
	3.7419999	6.4530000	-.00067209	.9999995	.00000	1.00000	-.0274090	.0000000	.0000000
165	3.8709999	6.4530000							
	3.9999999	6.4530000	-.0002700	.9999999	.00000	1.00000	-.0292866	.0000001	.0000000
166	4.1289999	6.4530000							
	4.2579998	6.4530000	.0001376	1.0000000	.00000	1.00000	-.0312765	.0000000	.0000000
167	4.3869998	6.4530000							
	4.5159998	6.4530000	.00035093	.9999997	.00000	1.00000	-.0333932	.0000000	.0000000
168	4.6449998	6.4530000							
	4.7739998	6.4530000	.0008508	.9999993	.00000	1.00000	-.0356518	.0000001	.0000000
169	4.9029998	6.4530000							
	5.0319998	6.4530000	.0011672	.9999986	.00000	1.00000	-.0380679	.0000001	.0000000
170	5.1609997	6.4530000							
	5.2899997	6.4530000	.0014620	.9999979	.00000	1.00000	-.0406580	.0000001	.0000000
171	5.4189997	6.4530000							
	5.5479996	6.4530000	.0017385	.9999970	.00000	1.00000	-.0434400	.0000001	.0000000
172	5.6769996	6.4530000							
	5.8059996	6.4530000	.0019990	.9999960	.00000	1.00000	-.0464331	.0000002	.0000000
173	5.9349996	6.4530000							
	6.0639995	6.4530000	.0022458	.9999950	.00000	1.00000	-.0496579	.0000001	.0000000
174	6.1929995	6.4530000							
	6.3219995	6.4530000	.0024910	.9999938	.00000	1.00000	-.0531364	.0000001	.0000000
175	6.4509995	6.4530000							
	6.5799995	6.4530000	.0027058	.9999927	.00000	1.00000	-.0568917	.0000000	.0000000
176	6.7089995	6.4530000							
	6.8379995	6.4530000	.0029218	.9999915	.00000	1.00000	-.0609485	.0000000	.0000000

POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY CASE NO. BF0C1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGNA	N	PHI
177	6.9669994	6.4530000							
	7.0959994	6.4530000	.0031301	.9999902	.00000	1.00000	-.0653317	-.0000001	.0000000
178	7.2249994	6.4530000							
	7.3539994	6.4530000	.0033317	.9999889	.00000	1.00000	-.0700664	-.0000001	.0000000
179	7.4829993	6.4530000							
	7.6119993	6.4530000	.0035278	.9999876	.00000	1.00000	-.0751766	-.0000001	.0000000
180	7.7409993	6.4530000							
	7.8699992	6.4530000	.0037193	.9999862	.00000	1.00000	-.0806842	-.0000000	.0000000
181	7.9989992	6.4530000							
	8.1279991	6.4530000	.0039073	.9999847	.00000	1.00000	-.0866066	-.0000003	.0000000
182	8.2569991	6.4530000							
	8.3859991	6.4530000	.0040918	.9999833	.00000	1.00000	-.0929543	-.0000002	.0000000
183	8.5149990	6.4530000							
	8.6439990	6.4530000	.0042746	.9999817	.00000	1.00000	-.0997279	-.0000002	.0000000
184	8.7729989	6.4530000							
	8.9019989	6.4530000	.0044557	.9999802	.00000	1.00000	-.1069131	-.0000003	.0000000
185	9.0309988	6.4530000							
	9.1599988	6.4530000	.0046360	.9999785	.00000	1.00000	-.1144764	-.0000002	.0000000
186	9.2889987	6.4530000							
	9.4179987	6.4530000	.0048160	.9999768	.00000	1.00000	-.1223589	-.0000003	.0000000
187	9.5469986	6.4530000							
	9.6759986	6.4530000	.0049959	.9999751	.00000	1.00000	-.1304701	-.0000003	.0000000
188	9.8049985	6.4530000							
	9.9339982	6.4530000	.0051751	.9999732	.00000	1.00000	-.1386828	-.0000003	.0000000
189	10.0629981	6.4530000							
	10.1919980	6.4530000	.0053535	.9999713	.00000	1.00000	-.1468287	-.0000004	.0000000
190	10.3209980	6.4530000							
	10.4499979	6.4530000	.0055303	.9999694	.00000	1.00000	-.1546975	-.0000003	.0000000
191	10.5789980	6.4530000							
	10.7079979	6.4530000	.0057139	.9999675	.00000	1.00000	-.1620423	-.0000004	.0000000
192	10.8369980	6.4530000							
	10.9659979	6.4530000	.0058870	.9999656	.00000	1.00000	-.1685916	-.0000004	.0000000
193	11.0949980	6.4530000							
	11.2239980	6.4530000	.0059769	.9999643	.00000	1.00000	-.1740825	-.0000004	.0000000
194	11.3529980	6.4530000							
	11.4819980	6.4530000	.0060622	.9999637	.00000	1.00000	-.1783603	-.0000004	.0000000
195	11.6109999	6.4530000							
	11.7399999	6.4530000	.0061708	.9999619	.00000	1.00000	-.1817134	-.0000005	.0000000
196	11.8690000	6.4530000							
	12.0237999	6.4530000	.0064764	.9999586	.00000	1.00000	-.1848743	-.0000004	.0000000
197	12.1786000	6.4530000							
	12.3643600	6.4530000	.0067195	.9999548	.00000	1.00000	-.1885208	-.0000006	.0000000
198	12.5501200	6.4530000							
	12.7730319	6.4530000	.0070072	.9999539	.00000	1.00000	-.1928828	-.0000005	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFOC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
199	12.9959440	6.4530000							
	13.2634380	6.4530000	.0073467	.9999460	.00000	1.00000	-.1981204	-.0000007	.0000000
200	13.5309319	6.4530000							
	13.8519255	6.4530000	.0077652	.9999397	.00000	1.00000	-.2043972	-.0000004	.0000000
201	14.1729190	6.4530000							
	14.5581110	6.4530000	.0382884	.9999313	.00000	1.00000	-.2118984	-.0000006	.0000000
202	14.9433030	6.4530000							
	15.4055330	6.4530000	.0089515	.9999199	.00000	1.00000	-.2208345	-.0000006	.0000000
203	15.8677630	6.4530000							
	16.3710690	6.4530000	.0097635	.9999047	.00000	1.00000	-.2309082	-.0000003	.0000000
204	16.3743751	6.4530000							
	17.3776810	6.4530000	.0106895	.9998857	.00000	1.00000	-.2412687	-.0000005	.0000000
205	17.8809869	6.4530000							
	18.3842928	6.4530000	.0117149	.9998628	.00000	1.00000	-.2514658	-.0000006	.0000000
206	18.8675990	6.4530000							
	19.3909049	6.4530000	.0128594	.9998346	.00000	1.00000	-.2614795	-.0000005	.0000000
207	19.8942111	6.4530000							
	20.3975165	6.4530000	.0141897	.9997998	.00000	1.00000	-.2712868	-.0000003	.0000000
208	20.9008219	6.4530000							
	21.4041278	6.4530000	.0156185	.9997561	.00000	1.00000	-.2808600	-.0000003	.0000000
209	21.9074340	6.4530000							
	22.4107399	6.4530000	.0173052	.9997005	.00000	1.00000	-.2901654	-.0000004	.0000000
210	22.9140460	6.4530000							
	23.4173520	6.4530000	.0192637	.9996289	.00000	1.00000	-.2991611	-.0000001	.0000000
211	23.9206581	6.4530000							
	24.4239640	6.4530000	.0215622	.9995351	.00000	1.00000	-.3077947	-.0000003	.0000000
212	24.9272699	6.4530000							
	25.4305758	6.4530000	.0242956	.9994097	.00000	1.00000	-.3159988	-.0000002	.0000000
213	25.9338820	6.4530000							
	26.4371874	6.4530000	.0275927	.9992387	.00000	1.00000	-.3236838	-.0000002	.0000000
214	26.9404931	6.4530000							
	27.4437990	6.4530000	.0316386	.9989990	.00000	1.00000	-.3307257	-.0000003	.0000000
215	27.9471049	6.4530000							
	28.4504108	6.4530000	.0367105	.9986524	.00000	1.00000	-.3369421	-.0000004	.0000000
216	28.9537170	6.4530000							
	29.4570229	6.4530000	.0432382	.9981305	.00000	1.00000	-.3420401	-.0000003	.0000000
217	29.9603291	6.4530000							
	30.4636350	6.4530000	.0519308	.9973032	.00000	1.00000	-.3455088	.0000003	.0000000
218	30.9669411	6.4530000							
	31.4702466	6.4530000	.0640552	.9958969	.00000	1.00000	-.3463740	.0000002	.0000000
219	31.9735520	6.4530000							
	32.4768577	6.4530000	.0821169	.9932568	.00000	1.00000	-.3426306	.0000003	.0000000
220	32.9801641	6.4530000							
	33.4834700	6.4530000	.1119268	.9874724	.00000	1.00000	-.3299290	.0000008	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
221	33.9867759	6.4530000							
	34.4980818	6.4530000	.1708332	.9708160	.30000	1.00000	-.2984254	.0000007	.0000000
222	34.9933882	6.4530000							
	35.4966941	6.4530000	.2925140	.9144356	.00000	1.00000	-.2253676	.0000007	.0000000
223	36.0000000	6.4530000							

ADDED MASS =

.0000000

VOLUME =

1335.0885936

SUM (T1 (DELTA S) =

3.6488886

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

.2-BODY CASE NO. BFOCI PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
1	8.0110000	.0000000							
	8.0152385	.1151024	-2.0503038	-3.2037458	.99742	.07174	2.1751735	-.0000026	.0000000
2	8.0275149	.2296225							
	8.0482578	.3442699	-5.9906795	-34.8882468	.97723	.21217	2.1246722	-.0000017	.0000000
3	8.0769252	.4571968							
	8.1128740	.5668563	-9.6314248	-91.7543433	.93964	.34216	2.0324268	-.0000002	.0000000
4	8.1558563	.6739545							
	8.2057551	.7786683	-12.8098564	-163.0924206	.88942	.45729	1.9090642	-.0000024	.0000000
5	8.2618482	.8801582							
	8.3240924	.9789357	-15.5014868	-239.2960911	.83059	.55629	1.7658075	-.0000012	.0000000
6	8.3916585	1.0741090							
	8.4645996	1.1662226	-17.7163205	-312.8680115	.76826	.64013	1.6125728	-.0000033	.0000000
7	8.5420380	1.2545090							
	8.6241082	1.3397385	-19.4990563	-379.2131958	.70414	.71006	1.4567177	-.0000014	.0000000
8	8.7099422	1.4210927							
	8.7967980	1.4967089	-20.8885713	-435.3324089	.64148	.76714	1.3055241	-.0000013	.0000000
9	8.8865939	1.5688088							
	8.9802898	1.6383442	-21.9625387	-481.3531036	.58112	.81382	1.1612588	-.0000017	.0000000
10	9.0764732	1.7043062							
	9.1759719	1.7676933	-22.7973968	-518.7213898	.52235	.85273	1.0222057	-.0000014	.0000000
11	9.2775625	1.8275751							
	9.3819519	1.8846011	-23.4319654	-548.0569992	.46548	.88506	.8892191	-.0000031	.0000000
12	9.4880913	1.9382993							
	9.5965809	1.9890973	-23.9095263	-570.2351532	.41060	.91182	.7623706	-.0000011	.0000000
13	9.7065265	2.0366619							
	9.8184350	2.0813177	-24.2311416	-586.1482162	.35762	.93387	.6412745	-.0000015	.0000000
14	9.9315463	2.1228321							
	10.0462868	2.1614498	-24.4454463	-596.5798416	.30639	.95191	.5252029	-.0000008	.0000000
15	10.1620110	2.1970111							
	10.2790741	2.2296982	-24.5587296	-602.1311951	.25669	.96649	.4132395	-.0000009	.0000000
16	10.3969290	2.2594333							
	10.5158712	2.2862633	-24.5794437	-603.1490479	.20830	.97807	.3042709	-.0000005	.0000000
17	10.6354350	2.3101971							
	10.7558620	2.3313097	-24.5090717	-599.6455765	.16095	.98696	.1970634	-.0000020	.0000000
18	10.8767570	2.3495520							
	10.9983147	2.3649888	-24.3339238	-591.1398468	.11442	.99343	.0902076	-.0000006	.0000000
19	11.1201990	2.3775911							
	11.2425621	2.3873996	-24.0281744	-576.3531647	.06845	.99765	-.0179614	-.0000007	.0000000
20	11.3651180	2.3943955							
	11.4880365	2.3981811	-23.3989158	-546.5092545	.02279	.99974	-.1306317	-.0000001	.0000000
21	11.6109999	2.4000000							
	11.7385459	2.4000000	-22.5334795	-506.7576942	.00000	1.00000	-.1697340	.0000001	.0000000
22	11.8660920	2.4000000							
	12.0191474	2.4000000	-21.8715669	-477.3655243	.00000	1.00000	-.1335702	.0000003	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
23	12.1722029	2.4000000							
	12.3558694	2.4000000	-21.4874294	-460.7096176	.00000	1.00000	-.1014736	-.0000001	.0000000
24	12.5395360	2.4000000							
	12.7599355	2.4000000	-21.2040441	-448.6114845	.00000	1.00000	-.0735085	.0000002	.0000000
25	12.9603350	2.4000000							
	13.2448145	2.4000000	-23.9956114	-439.8576851	.00000	1.00000	-.0500853	.0000004	.0000000
26	13.5092940	2.4000000							
	13.8266695	2.4000000	-23.8508916	-433.7596779	.00000	1.00000	-.0315711	.0000002	.0000000
27	14.1440450	2.4000000							
	14.5248954	2.4000000	-20.7554734	-429.7896729	.00000	1.00000	-.0180517	.0000003	.0000000
28	14.9057460	2.4000000							
	15.3627670	2.4000000	-20.6988704	-427.4432335	.00000	1.00000	-.0091467	.0000003	.0000000
29	15.8197880	2.4000000							
	16.3242929	2.4000000	-20.6702828	-426.2605896	.00000	1.00000	-.0041443	.0000003	.0000000
30	16.8287981	2.4000000							
	17.3333035	2.4000000	-23.6581028	-425.7572060	.00000	1.00000	-.0017952	.0000004	.0000000
31	17.8378091	2.4000000							
	18.3423140	2.4000000	-23.6532116	-425.5551491	.00000	1.00000	-.0007619	.0000002	.0000000
32	18.8468189	2.4000000							
	19.3513243	2.4000000	-20.6512418	-425.4737854	.00000	1.00000	-.0003229	-.0000001	.0000000
33	19.8558300	2.4000000							
	20.3603354	2.4000000	-20.6504452	-425.4408875	.00000	1.00000	-.0001373	.0000001	.0000000
34	20.8648410	2.4000000							
	21.3693459	2.4000000	-20.6501265	-425.427719	.00000	1.00000	-.0000611	.0000001	.0000000
35	21.8738511	2.4000000							
	22.3783565	2.4000000	-23.6499796	-425.421652	.00000	1.00000	-.0000338	.0000001	.0000000
36	22.8828621	2.4000000							
	23.3873670	2.4000000	-23.6498826	-425.417648	.00000	1.00000	-.0000345	.0000005	.0000000
37	23.8918719	2.4000000							
	24.3963773	2.4000000	-20.6497726	-425.4114532	.00000	1.00000	-.0000535	.0000006	.0000000
38	24.9008830	2.4000000							
	25.4053879	2.4000000	-20.6493869	-425.3971748	.00000	1.00000	-.00001435	.0000004	.0000000
39	25.9098930	2.4000000							
	26.4143984	2.4000000	-20.6485209	-425.3614159	.00000	1.00000	-.00003358	.0000001	.0000000
40	26.9189041	2.4000000							
	27.4234090	2.4000000	-23.6463465	-425.2717018	.00000	1.00000	-.00007848	.00000015	.0000000
41	27.9279139	2.4000000							
	28.4324193	2.4000000	-23.6409066	-425.0470238	.00000	1.00000	-.000018156	.00000014	.0000000
42	28.9369249	2.4000000							
	29.4414299	2.4000000	-20.6273203	-424.4863396	.00000	1.00000	-.00001410	.00000016	.0000000
43	29.9459350	2.4000000							
	30.4504404	2.4000000	-20.5935135	-423.0927963	.00000	1.00000	-.00002674	.00000015	.0000000
44	30.9549460	2.4000000							
	31.4594514	2.4000000	-20.5098395	-419.6535149	.00000	1.00000	-.00002100	.00000016	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

Z-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
45	31.9639571	2.4000000							
	32.8684620	2.4000000	-20.3053639	-411.3378903	.00000	1.00000	-.0424513	.0000017	.0000000
46	32.9729671	2.4000000							
	33.4774718	2.4000000	-19.8203177	-391.8449936	.00000	1.00000	-.0842646	.0000019	.0000000
47	33.9819770	2.4000000							
	34.4864821	2.4000000	-18.7374024	-350.0902481	.00000	1.00000	-.1535240	.0000010	.0000000
48	34.9909878	2.4000000							
	35.4954939	2.4000000	-16.4645202	-270.0804253	.00000	1.00000	-.2493139	.0000007	.0000000
49	36.0000000	2.4000000							
50	36.0000000	6.0000000							
	35.4954939	6.0000000	26.2669439	-688.9523392	.00000	-1.00000	7.2949687	-.0000093	.0000000
51	34.9909878	6.0000000							
	34.4864821	6.0000000	22.6221566	-510.7619667	.00000	-1.00000	8.2444847	-.0000076	.0000000
52	33.9819770	6.0000000							
	33.4774718	6.0000000	21.3321800	-454.0519011	.00000	-1.00000	8.3228323	-.0000072	.0000000
53	32.9729671	6.0000000							
	32.4684620	6.0000000	20.9103580	-436.2430687	.00000	-1.00000	8.0636740	-.0000057	.0000000
54	31.9639571	6.0000000							
	31.4594514	6.0000000	20.7541504	-429.7347565	.00000	-1.00000	7.6438341	-.0000032	.0000000
55	30.9549460	6.0000000							
	30.4504404	6.0000000	20.6927698	-427.1937196	.00000	-1.00000	7.1334200	-.0000061	.0000000
56	29.9459350	6.0000000							
	29.4414299	6.0000000	20.6680160	-426.1660816	.00000	-1.00000	6.5658227	-.0000035	.0000000
57	28.9369249	6.0000000							
	28.4324193	6.0000000	20.6578557	-425.7470016	.00000	-1.00000	5.9591110	-.0000023	.0000000
58	27.9279139	6.0000000							
	27.4234090	6.0000000	20.6536047	-425.5713882	.00000	-1.00000	5.3240879	-.0000017	.0000000
59	26.9189341	6.0000000							
	26.4143984	6.0000000	20.6517842	-425.4961891	.00000	-1.00000	4.6677672	-.0000008	.0000000
60	25.9098930	6.0000000							
	25.4053879	6.0000000	20.6539635	-425.4622917	.00000	-1.00000	3.9950143	-.0000005	.0000000
61	24.9008830	6.0000000							
	24.3963773	6.0000000	20.6505735	-425.4461823	.00000	-1.00000	3.3093874	-.0000004	.0000000
62	23.8918719	6.0000000							
	23.3873670	6.0000000	20.6503551	-425.4371643	.00000	-1.00000	2.6136073	-.0000014	.0000000
63	22.8828621	6.0000000							
	22.3783565	6.0000000	20.6502147	-425.4313660	.00000	-1.00000	1.9098258	-.0000011	.0000000
64	21.8738511	6.0000000							
	21.3693459	6.0000000	20.6500583	-425.4249039	.00000	-1.00000	1.1998017	-.0000002	.0000000
65	20.8648410	6.0000000							
	20.3603354	6.0000000	20.6497962	-425.4140816	.00000	-1.00000	.4850119	-.0000000	.0000000
66	19.8558300	6.0000000							

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

19.3513243	6.0000000	23.6492193	-425.3902550	.00000	-1.00000	-.2332773	-.0000003	.0000000
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POTENTIAL FLOW - FODF RELEASE 2

DATE 055177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. PFOC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
67	18.8468189	6.0000000	20.5478469	-425.3335803	.00000	-1.00000	-4.9539803	.0000001	.0000000
	18.3423140	6.0000000							
68	17.8378091	6.0000000	20.6444738	-425.1942978	.00000	-1.00000	-1.6762193	.0000006	.0000000
	17.3333035	6.0000000							
69	16.8287981	6.0000000	20.6361523	-424.8507767	.00000	-1.00000	-2.3994901	.0000003	.0000000
	16.3242929	6.0000000							
70	15.8197880	6.0000000	20.6173067	-424.0733337	.00000	-1.00000	-3.0898967	.0000025	.0000000
	15.3627670	6.0000000							
71	14.9057460	6.0000000	20.5914371	-422.955535	.00000	-1.00000	-3.6938250	.0000015	.0000000
	14.5248954	6.0000000							
72	14.1440450	6.0000000	20.5232470	-420.2036667	.00000	-1.00000	-4.2610726	.0000006	.0000000
	13.8266695	6.0000000							
73	13.5092940	6.0000000	20.4386971	-416.7403374	.00000	-1.00000	-4.6294466	.0000007	.0000000
	13.2448145	6.0000000							
74	12.9803350	6.0000000	20.3261197	-412.1511383	.00000	-1.00000	-4.9934055	.0000001	.0000000
	12.7599355	6.0000000							
75	12.5395360	6.0000000	20.1848731	-406.4291000	.00000	-1.00000	-5.3044671	.0000003	.0000000
	12.3556694	6.0000000							
76	12.1722029	6.0000000	20.0100000	-399.4001656	.00000	-1.00000	-5.5722531	.0000002	.0000000
	12.0191474	6.0000000							
77	11.8660920	6.0000000	19.7865281	-392.5066910	.00000	-1.00000	-5.8091110	.00000029	.0000000
	11.7385459	6.0000000							
78	11.6109999	6.0000000	19.4680920	-378.0066032	.00000	-1.00000	-6.0641055	.00000012	.0000000
	11.4849260	5.9993708							
79	11.3568570	5.9980749	19.2521400	-369.6448936	.00000	-1.00000	-6.2803291	.00000064	.0000000
	11.2336416	5.9957247							
80	11.1084460	5.9924832	19.1956897	-367.4744987	.00000	-1.00000	-6.4205039	.00000048	.0000000
	10.9840175	5.9884013							
81	10.8596190	5.9834879	19.1655972	-366.3201141	.00000	-1.00000	-6.5314915	.00000041	.0000000
	10.7359110	5.9777992							
82	10.6122410	5.9713367	19.1689653	-366.4492302	.00000	-1.00000	-6.5869178	.00000035	.0000000
	10.4891906	5.9641594							
83	10.3661840	5.9562637	19.1979079	-367.5596657	.00000	-1.00000	-6.6017427	.00000024	.0000000
	10.2437339	5.9477100							
84	10.1213320	5.9384915	19.2476163	-369.4707298	.00000	-1.00000	-6.5616472	.00000055	.0000000
	9.9994266	5.9286683							
85	9.8775721	5.9182321	19.3147509	-372.0596000	.00000	-1.00000	-6.5325446	.00000025	.0000000
	9.7561605	5.9072418							
86	9.6348013	5.8956888	19.3971779	-375.2505112	.00000	-1.00000	-6.4601182	.00000053	.0000000
	9.5138347	5.8836297							
87	9.3929205	5.8710565	19.4934943	-378.9963188	.00000	-1.00000	-6.3695762	.00000039	.0000000
	9.2723523	5.8580235							
88	9.1518356	5.8445236	19.6029313	-383.2749138	.00000	-1.00000	-6.2654700	.00000015	.0000000
	9.0316215	5.8306080							

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	N	PHI
89	8.9114568	5.8162727							
	8.7915541	5.8015628	19.7250879	-388.0790901	-.12332	-.99237	-6.1516881	-.0000056	.0000000
90	8.6716980	5.7864783							
	8.5520655	5.7710621	19.6601165	-393.4242249	-.12918	-.99162	-6.3314115	-.0000039	.0000000
91	8.4324759	5.7553149							
	8.3130736	5.7392761	23.0381108	-399.3244934	-.13432	-.99094	-5.9071987	-.0000053	.0000000
92	8.1937102	5.7229496							
	8.0744991	5.7063711	20.1695802	-405.8119459	-.13876	-.99033	-5.7810367	-.0000062	.0000000
93	7.9553225	5.6895475							
	7.8362648	5.6725104	20.3450415	-412.9207115	-.14250	-.98979	-5.6544393	-.0000060	.0000000
94	7.7172364	5.6552704							
	7.5982949	5.6378548	20.5349574	-420.6844749	-.14555	-.98935	-5.5285023	-.0000066	.0000000
95	7.4793769	5.6202781							
	7.3605146	5.6025631	20.7397645	-429.1378288	-.14791	-.98893	-5.4039998	-.0000050	.0000000
96	7.2416701	5.5847288							
	7.1228507	5.5667928	20.9599295	-438.3185417	-.14958	-.98875	-5.2814277	-.0000066	.0000000
97	7.0040429	5.5487792							
	6.8852304	5.5306991	21.1948531	-448.2217941	-.15058	-.98860	-5.1609964	-.0000063	.0000000
98	6.7664229	5.5125853							
	6.6475802	5.4944441	21.4450119	-458.8885307	-.15090	-.98855	-5.0432019	-.0000063	.0000000
99	6.5287375	5.4763033							
	6.4099004	5.4581881	21.7117169	-470.3986473	-.15054	-.98860	-4.9276944	-.0000055	.0000000
100	6.2910579	5.4401098							
	6.1722546	5.4221053	21.9930124	-482.6925926	-.14950	-.98876	-4.8143355	-.0000036	.0000000
101	6.0534394	5.4041809							
	5.9346336	5.3863657	22.2875786	-495.7361565	-.14779	-.98902	-4.7032270	-.0000035	.0000000
102	5.8158097	5.3686723							
	5.6969648	5.3511245	22.5951879	-509.5425148	-.14539	-.98937	-4.5940948	-.0000035	.0000000
103	5.5780960	5.3337401							
	5.4591755	5.3165385	22.9148862	-524.0920105	-.14231	-.98982	-4.4866801	-.0000054	.0000000
104	5.3402255	5.2995417							
	5.2211922	5.2827654	23.2455342	-539.3548584	-.13853	-.99036	-4.3807060	-.0000066	.0000000
105	5.1021244	5.2662359							
	4.9829406	5.2499650	23.5859587	-555.2974472	-.13426	-.99097	-4.2759078	-.0000050	.0000000
106	4.8637178	5.2339833							
	4.7443452	5.2182993	23.9350603	-571.8872926	-.12889	-.99166	-4.1720193	-.0000045	.0000000
107	4.6249295	5.2029475							
	4.5053288	5.1879333	24.2916944	-589.0864105	-.12300	-.99241	-4.0687954	-.0000047	.0000000
108	4.3856817	5.1732945							
	4.2658126	5.1590343	24.6550901	-606.8734565	-.11639	-.99323	-3.9660176	-.0000049	.0000000
109	4.1456942	5.1451945							
	4.0257148	5.1317750	25.0246897	-625.2350522	-.10925	-.99404	-3.8635205	-.0000055	.0000000
110	3.9054843	5.1188215							
	3.7849513	5.1063317	25.4006834	-644.1947098	-.10095	-.99489	-3.7611995	-.0000050	.0000000

POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TLST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
111	3.6643663	5.0943546							
	3.5434346	5.0828863	25.7841685	-663.8233414	-.09210	-.99575	-3.6590427	-.0000064	.0000000
112	3.4224512	5.0719786							
	3.3010736	5.0616266	26.1778257	-684.2785568	-.08248	-.99659	-3.5571535	-.0000048	.0000000
113	3.1796457	5.0518844							
	3.0577727	5.0427473	26.5869005	-705.8632736	-.07206	-.99740	-3.4557452	-.0000036	.0000000
114	2.9358520	5.0342705							
	2.8134310	5.0264507	27.0207820	-729.1226578	-.06084	-.99815	-3.3550844	-.0000051	.0000000
115	2.6909667	5.0193437							
	2.5679423	5.0129486	27.4964507	-755.0547943	-.04880	-.99881	-3.2553021	-.0000052	.0000000
116	2.4448805	5.0073202							
	2.3211935	5.0024623	28.0453975	-785.5443192	-.03592	-.99935	-3.1559286	-.0000055	.0000000
117	2.1974770	4.9984267							
	2.0730640	4.9952242	28.7511239	-825.6271210	-.02219	-.99975	-3.0549772	-.0000047	.0000000
118	1.9486315	4.9929024							
	1.8233214	4.9912016	29.8553634	-890.3427200	-.00759	-.99997	-2.9317088	-.0000047	.0000000
119	1.6980000	4.9910000							
	1.6122447	4.9923773	31.2920411	-978.1918335	.02530	-.99968	-2.7319790	-.0000034	.0000000
120	1.5265295	4.9953400							
	1.4451099	5.0004653	32.3368959	-1044.6748352	.07516	-.99717	-2.5142890	-.0000045	.0000000
121	1.3638420	5.0076025							
	1.2867347	5.0162761	32.9311140	-1081.4832916	.12396	-.99229	-2.3459731	-.0000036	.0000000
122	1.2078634	5.0268385							
	1.1370124	5.0386708	33.3691940	-1112.5030975	.17254	-.98500	-2.1961701	-.0000028	.0000000
123	1.0644770	5.0523051							
	.9958170	5.0669929	33.7735586	-1139.6532593	.22163	-.97513	-2.0584775	-.0000041	.0000000
124	.9275536	5.0834258							
	.8630218	5.1007380	34.1521034	-1165.3661652	.27196	-.96231	-1.9283289	-.0000026	.0000000
125	.7989744	5.1197639							
	.7385202	5.1395319	34.5316558	-1191.4352417	.32423	-.94598	-1.8020106	-.0000009	.0000000
126	.6786504	5.1610051							
	.6222462	5.1831179	34.9329805	-1219.3131256	.37921	-.92531	-1.6759954	.0000003	.0000000
127	.5665420	5.2069486							
	.5141859	5.2313510	35.3722796	-1250.1981659	.43766	-.89914	-1.5465758	.0000000	.0000000
128	.4626816	5.2575035							
	.4154019	5.2836321	35.8564987	-1284.6884912	.49976	-.86617	-1.4109059	.0000004	.0000000
129	.3691185	5.3114873							
	.3262277	5.3396325	36.3838124	-1322.7817993	.56589	-.82448	-1.2645064	.0000013	.0000000
130	.2845438	5.3695369							
	.2462618	5.3996398	36.9454947	-1363.9695740	.63658	-.77121	-1.1020418	.0000009	.0000000
131	.2094480	5.4315221							
	.1761083	5.4634883	37.5391715	-1405.9379425	.71141	-.73277	-.9172174	.0000005	.0000000
132	.1445518	5.4972162							
	.1176815	5.5294433	37.9966149	-1442.7427368	.78674	-.61728	-.7107459	-.0000006	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	TI	CP	SIN A	COS A	SIGMA	M	PHI
133	.0927733	5.5632098							
	.0710843	5.5969337	38.3143954	-1466.5728894	.85888	-.51218	-.4821714	-.0000008	.0000000
134	.0517239	5.6320462							
	.0356628	5.6669440	38.3539586	-1470.0261383	.92349	-.38363	-.2333504	-.0000013	.0000000
135	.0222693	5.7029503							
	.0122057	5.7384667	38.0411987	-1446.1327972	.97232	-.23365	.0151514	-.0000003	.0000000
136	.0050333	5.7746781							
	.0010348	5.8072249	38.1347971	-1453.2627411	.99704	-.07683	.2061663	-.0000020	.0000000
137	.0000000	5.8400000							
	.0027027	5.8743638	38.6849570	-1495.5258942	.98884	.14931	.5960291	-.0000015	.0000000
138	.0102465	5.9079982							
	.0232597	5.9373530	35.6838741	-1272.3388672	.88255	.47022	1.4123307	-.0000010	.0000000
139	.0403651	5.9645276							
	.0596903	5.9879149	29.9429927	-895.5828094	.73832	.67445	1.9160218	-.0000035	.0000000
140	.0812386	6.0092714							
	.1021562	6.0271011	25.1288252	-630.4578552	.62532	.78037	2.1475414	-.0000014	.0000000
141	.1241164	6.0436297							
	.1491852	6.0605449	21.4462156	-458.9401627	.54000	.84167	2.2541889	-.0000020	.0000000
142	.1750100	6.0762820							
	.2038299	6.0922922	18.4326572	-338.7628517	.46974	.88281	2.3049669	.0000002	.0000000
143	.2332099	6.1072499							
	.2655795	6.1224565	15.9846358	-254.5085812	.41208	.91115	2.3246807	-.0000011	.0000000
144	.2983746	6.1367220							
	.3342397	6.1512396	13.9813701	-194.4787083	.36425	.93130	2.3273925	-.0000012	.0000000
145	.3704374	6.1649070							
	.4098453	6.1788353	12.3222646	-150.8382034	.32392	.94609	2.3212908	-.0000018	.0000000
146	.4495205	6.1919830							
	.4925903	6.2053967	10.9302605	-118.4705954	.28933	.95723	2.3111868	-.0000011	.0000000
147	.5358801	6.2180863							
	.577839	6.2310433	9.7479268	-94.5220766	.25919	.96583	2.3000142	-.0000005	.0000000
	.619728	6.2433105							
	.661335	6.2558419	8.7325248	-75.2569885	.23251	.97259	2.2896430	-.0000005	.0000000
	.702366	6.2677103							
	.743196	6.2798304	7.8520719	-60.6550326	.20855	.97801	2.2813190	-.0000005	.0000000
	.783804	6.2913041							
	.824184	6.3030087	7.0821669	-49.1570868	.18673	.98241	2.2759397	-.0000006	.0000000
	.8623779	6.3140746							
	.90271180	6.3253413	6.4040727	-40.0121469	.16659	.98603	2.2741652	-.0000022	.0000000
	.9419661	6.3359682							
	.981619567	6.3467551	5.8033106	-32.6760926	.14773	.98903	2.2765153	-.0000001	.0000000
	1.02320445	6.3568918							
	1.07076666	6.3671342	5.2675852	-26.7474539	.12982	.99154	2.2834017	-.0000004	.0000000
154	1.3833770	6.3767059							
	1.4650454	6.3863122	4.7881747	-21.9266167	.11254	.99365	2.2951516	.0000011	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 3.0

2-BODY CASE NO. BFOC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
155	1.5467935	6.3952146							
	1.6349574	6.4040580	4.3571663	-17.9848979	.09555	.99542	2.3120536	.0000016	.0000000
156	1.7231928	6.4121470							
	1.8183392	6.4200526	3.9682114	-14.7467312	.07846	.99692	2.3344372	.0000025	.0000000
157	1.9135500	6.4271276							
	2.0162014	6.4338492	3.6151013	-12.0689576	.06071	.99816	2.3628141	.0000011	.0000000
158	2.1189107	6.4396189							
	2.2296323	6.4447989	3.3107062	-9.9607756	.04138	.99914	2.3976657	.0000034	.0000000
159	2.3404030	6.4487913							
	2.4606907	6.4515117	3.0047376	-8.0284482	.01749	.99985	2.4528143	.0000028	.0000000
160	2.5810300	6.4530000							
	2.7100000	6.4530000	2.6271954	-5.9021554	.00600	1.00000	2.5576676	.0000027	.0000000
161	2.8390000	6.4530000							
	2.9680000	6.4530000	2.4133792	-4.6243989	.00000	1.00000	2.6605447	.0000044	.0000000
162	3.0970000	6.4530000							
	3.2260000	6.4530000	2.2148446	-3.9055368	.00000	1.00000	2.7539847	.0000032	.0000000
163	3.3550000	6.4530000							
	3.4839999	6.4530000	2.0503854	-3.2040801	.00000	1.00000	2.8454768	.0000054	.0000000
164	3.6129999	6.4530000							
	3.7419999	6.4530000	1.9096596	-2.6467996	.00000	1.00000	2.9374618	.0000047	.0000000
165	3.8709999	6.4530000							
	3.9999999	6.4530000	1.7874365	-2.1949294	.00000	1.00000	3.0311753	.0000069	.0000000
166	4.1289999	6.4530000							
	4.2579998	6.4530000	1.6871184	-1.8227977	.00000	1.00000	3.1273687	.0000055	.0000000
167	4.3869998	6.4530000							
	4.5159998	6.4530000	1.5850556	-1.5124013	.00000	1.00000	3.2265473	.0000069	.0000000
168	4.6449998	6.4530000							
	4.7739998	6.4530000	1.5032469	-1.2507407	.00000	1.00000	3.3290814	.0000069	.0000000
169	4.9029998	6.4530000							
	5.0319998	6.4530000	1.4241197	-1.0281168	.00000	1.00000	3.4352590	.0000057	.0000000
170	5.1609997	6.4530000							
	5.2899997	6.4530000	1.3554201	-.8371638	.00000	1.00000	3.5453134	.0000065	.0000000
171	5.4189997	6.4530000							
	5.5479996	6.4530000	1.2931439	-.6722212	.00000	1.00000	3.6594391	.0000093	.0000000
172	5.6769996	6.4530000							
	5.8059996	6.4530000	1.2364616	-.5288373	.00000	1.00000	3.7777959	.0000092	.0000000
173	5.9349996	6.4530000							
	6.0639995	6.4530000	1.1846842	-.4034767	.00000	1.00000	3.9005063	.0000089	.0000000
174	6.1929995	6.4530000							
	6.3219995	6.4530000	1.1372294	-.2932908	.00000	1.00000	4.0276456	.0000083	.0000000
175	6.4509995	6.4530000							
	6.5799995	6.4530000	1.0936186	-.1960017	.00000	1.00000	4.1592280	.0000130	.0000000
176	6.7089995	6.4530000							
	6.8379995	6.4530000	1.0534242	-.1097025	.00000	1.00000	4.2951860	.0000125	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFQC1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
177	6.9669994	6.4530000							
	7.0959994	6.4530000	1.0162975	.0328607	.00000	1.00000	4.4353333	.0000114	.0000000
178	7.2249994	6.4530000							
	7.3539994	6.4530000	.9819417	.0357906	.00000	1.00000	4.5793292	.0000097	.0000000
179	7.4829993	6.4530000							
	7.6119993	6.4530000	.9500627	.0973808	.00000	1.00000	4.7266173	.0000116	.0000000
180	7.7409993	6.4530000							
	7.8699992	6.4530000	.9204491	.1527735	.00000	1.00000	4.8763728	.0000103	.0000000
181	7.9989992	6.4530000							
	8.1279991	6.4530000	.8928627	.2027962	.00000	1.00000	5.0274206	.0000154	.0000000
182	8.2569991	6.4530000							
	8.3859991	6.4530000	.8671713	.2480139	.00000	1.00000	5.1781579	.0000098	.0000000
183	8.5149990	6.4530000							
	8.6439990	6.4530000	.8431748	.2890563	.00000	1.00000	5.3264511	.0000126	.0000000
184	8.7729989	6.4530000							
	8.9019989	6.4530000	.8207521	.3263659	.00000	1.00000	5.4695532	.0000150	.0000000
185	9.0309988	6.4530000							
	9.1599988	6.4530000	.7997958	.3603267	.00000	1.00000	5.6040584	.0000161	.0000000
186	9.2889987	6.4530000							
	9.4179987	6.4530000	.7802094	.3912733	.00000	1.00000	5.7256061	.0000181	.0000000
187	9.5469986	6.4530000							
	9.6759986	6.4530000	.7619056	.4194999	.00000	1.00000	5.8293762	.0000118	.0000000
188	9.8049985	6.4530000							
	9.9339982	6.4530000	.7440276	.4452319	.00000	1.00000	5.9096741	.0000159	.0000000
189	10.0629981	6.4530000							
	10.1919980	6.4530000	.7259819	.4685854	.00000	1.00000	5.9604010	.0000176	.0000000
190	10.3209980	6.4530000							
	10.4499979	6.4530000	.7142551	.4898397	.00000	1.00000	5.9753634	.0000172	.0000000
191	10.5789980	6.4530000							
	10.7079979	6.4530000	.7006983	.5092219	.00000	1.00000	5.9488517	.0000195	.0000000
192	10.8369980	6.4530000							
	10.9659979	6.4530000	.6884616	.5260206	.00000	1.00000	5.9764480	.0000207	.0000000
193	11.0949980	6.4530000							
	11.2239980	6.4530000	.6787289	.5393542	.00000	1.00000	5.7563922	.0000213	.0000000
194	11.3529980	6.4530000							
	11.4819980	6.4530000	.6706339	.5502501	.00000	1.00000	5.5933201	.0000203	.0000000
195	11.6109999	6.4530000							
	11.7399999	6.4530000	.6589541	.5657794	.00000	1.00000	5.4033336	.0000169	.0000000
196	11.8690000	6.4530000							
	12.0237999	6.4530000	.6445681	.5845320	.00000	1.00000	5.1872078	.0000157	.0000000
197	12.1786000	6.4530000							
	12.3643600	6.4530000	.6307910	.6021028	.00000	1.00000	4.9336396	.0000168	.0000000
198	12.5501200	6.4530000							
	12.7730319	6.4530000	.6175654	.6186130	.00000	1.00000	4.6390340	.0000165	.0000000

POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQCI PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	N	PHI
199	12.9959440	6.4530000							
	13.2634380	6.4530000	.6039113	.6352912	.00000	1.00000	4.2952039	.0000120	.0000000
200	13.5309319	6.4530000							
	13.8519255	6.4530000	.5901098	.6517704	.00000	1.00000	3.8912528	.0000126	.0000000
201	14.1729190	6.4530000							
	14.5581110	6.4530000	.5770035	.6670670	.00000	1.00000	3.4134832	.0000120	.0000000
202	14.9433030	6.4530000							
	15.4055330	6.4530000	.5558407	.6798243	.00000	1.00000	2.8450604	.0000064	.0000000
203	15.8677630	6.4530000							
	16.3710690	6.4530000	.5586137	.6879507	.00000	1.00000	2.2001304	.0000048	.0000000
204	16.8743751	6.4530000							
	17.3776810	6.4530000	.5567130	.6900707	.00000	1.00000	1.5290603	.0000026	.0000000
205	17.8809869	6.4530000							
	18.3842928	6.4530000	.5614454	.6859009	.00000	1.00000	.8590164	.0000015	.0000000
206	18.8875990	6.4530000							
	19.3909049	6.4530000	.5699605	.6751449	.00000	1.00000	.1904479	-.0000009	.0000000
207	19.8942111	6.4530000							
	20.3975165	6.4530000	.5855872	.6570877	.00000	1.00000	-.4758456	-.0000023	.0000000
208	20.9008219	6.4530000							
	21.4041278	6.4530000	.6078889	.6304722	.00000	1.00000	-1.1388684	-.0000055	.0000000
209	21.9074340	6.4530000							
	22.4107399	6.4530000	.6377044	.5933332	.00000	1.00000	-1.7974539	-.0000047	.0000000
210	22.9140460	6.4530000							
	23.4173520	6.4530000	.6762735	.5426542	.00000	1.00000	-2.4502397	-.0000056	.0000000
211	23.9206581	6.4530000							
	24.4239640	6.4530000	.7253251	.4739035	.00000	1.00000	-3.0956027	-.0000095	.0000000
212	24.9272699	6.4530000							
	25.4305758	6.4530000	.7873293	.3801126	.00000	1.00000	-3.7315581	-.0000083	.0000000
213	25.9338820	6.4530000							
	26.4371874	6.4530000	.8657940	.2504008	.00000	1.00000	-4.3555974	-.0000106	.0000000
214	26.9404931	6.4530000							
	27.4437990	6.4530000	.9658430	.0671472	.00000	1.00000	-4.9644393	-.0000192	.0000000
215	27.9471049	6.4530000							
	28.4504108	6.4530000	1.0952145	-.1994948	.00000	1.00000	-5.5535981	-.0000224	.0000000
216	28.9537170	6.4530000							
	29.4570229	6.4530000	1.2650431	-.6028650	.00000	1.00000	-6.1166002	-.0000208	.0000000
217	29.9603291	6.4530000							
	30.4636350	6.4530000	1.4985439	-1.2456339	.00000	1.00000	-6.6434542	-.0000168	.0000000
218	30.9669411	6.4530000							
	31.4702466	6.4530000	1.8290493	-2.3454214	.00000	1.00000	-7.1174054	-.0000139	.0000000
219	31.9735520	6.4530000							
	32.4768577	6.4530000	2.3310531	-4.4338086	.00000	1.00000	-7.5074244	-.0000085	.0000000
220	32.9801641	6.4530000							
	33.4834700	6.4530000	3.1848735	-9.1434189	.00000	1.00000	-7.7482960	.0000010	.0000000

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POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

ON-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	T1	CP	SIN A	COS A	SIGMA	M	PHI
221	33.9867759	6.4530000							
	34.4900818	6.4530000	9.9703043	-23.7039242	.00000	1.00000	-7.6755620	-.0000091	.0000000
222	34.9933882	6.4530000							
	35.4966941	6.4530000	9.2691845	-84.9170399	.00000	1.00000	-6.7997958	-.0000002	.0000000
223	36.0000000	6.4530000							

ADDED MASS =

.0000000

VOLUME =

1335.0865936

SUM IT1(DELTA S) =

288.2151600

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET PUNCHED WHEN THERE IS PUNCHED OUTPUT

.80152085+01	.80462578+01	.81128740+01	.82057551+01
.83243924+01	.84645796+01	.86241382+01	.87967980+01
.89802898+01	.91759719+01	.93819519+01	.95965809+01
.98164350+01	.10046287+02	.10279074+02	.10515871+02
.10755662+02	.10998315+02	.11242562+02	.11488037+02
.11738546+02	.12019147+02	.12355869+02	.12759935+02
.13244815+02	.13826669+02	.14524895+02	.15362767+02
.16324293+02	.17333303+02	.18342314+02	.19351324+02
.20360335+02	.21369346+02	.22378356+02	.23387367+02
.24396377+02	.25405388+02	.26414398+02	.27423409+02
.28432419+02	.29441430+02	.30450440+02	.31459451+02
.32468462+02	.33477472+02	.34486482+02	.35495494+02
.36495494+02	.37486482+02	.38477472+02	.39468462+02
.40459451+02	.41450440+02	.42441430+02	.43432419+02
.44423409+02	.45414398+02	.46405388+02	.47396377+02
.48387367+02	.49378356+02	.50369346+02	.51360335+02
.52351324+02	.53342314+02	.54333303+02	.55324293+02
.56316276+02	.57304895+02	.58286669+02	.59264815+02
.60247599+02	.61225869+02	.62201914+02	.63178546+02
.64148492+02	.65123364+02	.66098401+02	.67073591+02
.68048919+02	.69024373+02	.70999426+01	.71975616+01
.72951383+01	.73927352+01	.74903162+01	.75879155+01
.76852365+01	.77831073+01	.78744991+01	.79626489+01
.80582949+01	.81560514+01	.82428507+01	.83285230+01
.84147580+01	.85009900+01	.85872254+01	.86734633+01
.87596964+01	.88459175+01	.89321192+01	.90182940+01
.91044345+01	.91905328+01	.92765812+01	.93625714+01
.94484951+01	.95344346+01	.96207336+01	.97057727+01
.97813431+01	.98679423+01	.99511935+01	.0030640+01
.01233214+01	.02122447+01	.03045109+01	.03967347+01
.04870124+01	.05758169+00	.06630218+00	.07485201+00
.08322449+00	.09141858+00	.10040193+00	.10862277+00
.11626183+00	.12410827+00	.13176815+00	.13904336+01
.14662759+01	.15405727+01	.16134779+02	.16827422+02
.1759684-01	.18390291-01	.19215616+00	.20018521+00
.2082987+00	.21657954+00	.22423974+00	.23198453+00
.23925902+00	.24727839+00	.25482546+00	.26218959+00
.26924184+00	.27627118+01	.28319567+01	.29076668+01
.29850454+01	.30634957+01	.31383392+01	.32162014+01
.3296323+01	.33606907+01	.34300000+01	.34968003+01
.35726000+01	.36483999+01	.37219999+01	.37999999+01
.38759998+01	.39515998+01	.40273998+01	.41031998+01
.41789997+01	.42547996+01	.43285996+01	.44063995+01
.44831995+01	.45579995+01	.46379995+01	.47095994+01
.47833994+01	.48611993+01	.49369992+01	.50127991+01
.50859991+01	.51643990+01	.52401989+01	.53159988+01
.53947987+01	.54759986+01	.55539982+01	.56319198+02
.57044998+02	.57807998+02	.58599998+02	.59323998+02
.60148199+02	.60900000+02	.61623800+02	.62364363+02
.63177303+02	.63963438+02	.64785192+02	.65558111+02
.66405533+02	.67163710+02	.67977681+02	.68784293+02
.69590905+02	.70397516+02	.71204128+02	.72010740+02
.72817352+02	.73623964+02	.74430576+02	.75237187+02

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

.64530000+01	.64530000+01	.64530000+01	.64530000+01
.64530000+01			
.97735076+01	.28777923+00	.46257190+00	.61509950+00
.74417929+00	.85031389+00	.93567616+00	.10021597+01
.10535091+01	.10933995+01	.11236995+01	.11460566+01
.11618156+01	.11720145+01	.11773832+01	.11783253+01
.11748614+01	.11664785+01	.11517930+01	.11216049+01
.10801007+01	.10483549+01	.10299242+01	.10163238+01
.10063651+01	.99936734+00	.99178371+00	.99206452+00
.99069107+00	.99010552+00	.98987041+00	.98977569+00
.98973750+00	.98972207+00	.98971590+00	.98971342+00
.98971246+00	.98971221+00	.98971252+00	.98971365+00
.98971666+00	.98972425+00	.98974319+00	.98979010+00
.98990472+00	.99017675+00	.99078462+00	.99206161+00
-.98659530+00	-.98861033+00	-.98932934+00	-.98956539+00
-.98965283+00	-.98568716+00	-.98970097+00	-.98970662+00
-.98970896+00	-.98970984+00	-.98971011+00	-.98970991+00
-.98970924+00	-.98970738+00	-.98970294+00	-.98969200+00
-.98966527+00	-.98959948+00	-.98943673+00	-.98903671+00
-.98813342+00	-.98641323+00	-.98361813+00	-.97955219+00
-.97413240+00	-.96733125+00	-.95899898+00	-.94729112+00
-.93324995+00	-.92376638+00	-.92026570+00	-.91876866+00
-.91889130+00	-.92024954+00	-.92260402+00	-.92579438+00
-.92971540+00	-.93430029+00	-.93951050+00	-.94532875+00
-.95175622+00	-.95880128+00	-.96648426+00	-.97482675+00
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-.10273045+01	-.10395717+01	-.10527922+01	-.10666164+01
-.10810003+01	-.10958819+01	-.11111877+01	-.11268376+01
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-.12071184+01	-.12229894+01	-.12386766+01	-.12542202+01
-.12697780+01	-.12857385+01	-.13029822+01	-.13236408+01
-.13605262+01	-.14072507+01	-.14317451+01	-.14338209+01
-.14251488+01	-.14076150+01	-.13818800+01	-.13477921+01
-.13045140+01	-.12504653+01	-.11839759+01	-.11022068+01
-.10005593+01	-.87358004+00	-.71881361+00	-.53239392+00
-.30708806+00	-.40738974+01	.25015965+00	.60299246+00
.95039063+00	.11138361+01	.11760308+01	.12014840+01
.12120775+01	.12146721+01	.12131586+01	.12095390+01
.12048752+01	.11997396+01	.11944400+01	.11891464+01
.11839467+01	.11788786+01	.11739498+01	.11691399+01
.11644032+01	.11596560+01	.11547462+01	.11493931+01
.11430560+01	.11296806+01	.11048596+01	.10829748+01
.10714438+01	.10629126+01	.10562431+01	.10508351+01
.10463384+01	.10425292+01	.10392553+01	.10364082+01
.10339083+01	.10316951+01	.10297217+01	.10279514+01
.10263546+01	.10249073+01	.10235901+01	.10223863+01
.10212823+01	.10202670+01	.10193301+01	.10184639+01
.10176601+01	.10169132+01	.10162173+01	.10155673+01
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POTENTIAL FLOW - EODF RELEASE 2

DATE C53177

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64055203-01 .82116906-01 .11192679+00 .17083317+00
29251400+00

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

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 -.21962539+02-.22797399+02-.23431965+02-.23900526+02
 -.24231142+02-.24445446+02-.24558730+02-.24579444+02
 -.24508072+02-.24333924+02-.24328174+02-.23398916+02
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 -.20650445+02-.20650126+02-.20649980+02-.20649883+02
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 .26266944+02 .22622157+02 .21332180+02 .20910358+02
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 .20653605+02 .20651784+02 .20650964+02 .20650573+02
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 .20649219+02 .20647847+02 .20644474+02 .20634152+02
 .20617307+02 .20581437+02 .20523247+02 .20438697+02
 .20326120+02 .20184873+02 .20310002+02 .19786528+02
 .19468092+02 .19252140+02 .19195690+02 .19165597+02
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 .19397178+02 .19493494+02 .19602931+02 .19725088+02
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 .21445012+02 .21711717+02 .21993012+02 .22287579+02
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 .23935060+02 .24291694+02 .24655090+02 .25024690+02
 .25400683+02 .25784168+02 .26177826+02 .26586903+02
 .27020782+02 .27496451+02 .28045398+02 .28751124+02
 .29855363+02 .31292041+02 .32336896+02 .32901114+02
 .33369194+02 .33773559+02 .34152103+02 .34531656+02
 .34932981+02 .35372280+02 .35856499+02 .36383812+02
 .36945495+02 .37509171+02 .37996615+02 .38314395+02
 .38353959+02 .38041199+02 .38134797+02 .38684957+02
 .35683874+02 .29942993+02 .25128825+02 .21446216+02
 .18432657+02 .15984636+02 .13981370+02 .12322265+02
 .10930261+02 .97479268+01 .87325248+01 .78520719+01
 .70821669+01 .64040727+01 .58031106+01 .52675852+01
 .47881747+01 .43571663+01 .39582114+01 .36151013+01
 .33107062+01 .30047376+01 .26271954+01 .24133792+01
 .22148446+01 .20503854+01 .19096596+01 .17874365+01
 .16801184+01 .15850556+01 .15002469+01 .14241197+01
 .13554201+01 .12931439+01 .12364616+01 .11846842+01
 .11372294+01 .10936186+01 .10534242+01 .10162975+01
 .98194166+00 .95036274+00 .92044906+00 .89286271+00
 .86717135+00 .84317477+00 .82075214+00 .79979579+00
 .78020941+00 .76190555+00 .74482760+00 .72898193+00
 .71425508+00 .70069829+00 .68846165+00 .67870891+00
 .67063394+00 .65895414+00 .64456809+00 .63079096+00
 .61756536+00 .60391128+00 .59010983+00 .57700349+00
 .56584068+00 .55861375+00 .55671297+00 .56044543+00
 .56996061+00 .58558719+00 .60788800+00 .63770436+00
 .67627348+00 .72532512+00 .78732930+00 .86579396+00
 .96584304+00 .10952145+01 .12660431+01 .14985439+01
 .18290493+01 .23310531+01 .31848735+01 .49703043+01
 .92691445+01

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

OFF-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
1	-.5000000	.0000000	1.0336591	.0000000	1.0336591	.0000000	.0000000
2	-.5000000	.7222222	1.0330983	-.0120317	1.0331663	-.6672470	.0000000
3	-.5000000	1.4444444	1.0310823	-.0253577	1.0313941	-1.4088063	.0000000
4	-.5000000	2.1666666	1.0264089	-.0414884	1.0272471	-2.3146879	.0000000
5	-.5000000	2.8888889	1.0161811	-.0623453	1.0180918	-3.5108408	.0000000
6	-.5000000	3.6111111	.9933906	-.0900277	.9974618	-5.1783831	.0000000
7	-.5000000	4.3333333	.9399686	-.1229830	.9479799	-7.4540875	.0000000
8	-.5000000	5.0555555	.8140050	-.1256514	.8236458	-8.7750275	.0000000
9	-.5000000	5.7777777	.6901083	.0774861	.6944447	6.4064007	.0000000
10	-.5000000	6.4999999	.8722401	.1858291	.8918156	12.3269439	.0000000
11	.0000000	.0000000	1.0503445	.0000000	1.0503445	.0000000	.0000000
12	.0000000	.6111111	1.0504256	-.0104217	1.0504773	-.5684384	.0000000
13	.0000000	1.2222222	1.0505719	-.0218462	1.0507991	-1.1913765	.0000000
14	.0000000	1.8333333	1.0504450	-.0354844	1.0510441	-1.9347386	.0000000
15	.0000000	2.4444444	1.0492753	-.0530308	1.0506146	-2.8932928	.0000000
16	.0000000	3.0555555	1.0453252	-.0772361	1.0481747	-4.2257433	.0000000
17	.0000000	3.6666666	1.0342607	-.1130684	1.0404229	-6.2389638	.0000000
18	.0000000	4.2777777	1.0034192	-.1702157	1.0177541	-9.6277568	.0000000
19	.0000000	4.8888888	.9063254	-.2663137	.9446421	-16.3748410	.0000000
20	.0000000	5.4999999	.4837141	-.3517357	.5980780	-36.0230098	.0000000
21	.5000000	.0000000	1.0667746	.0000000	1.0667746	.0000000	.0000000
22	.5000000	.5692158	1.0673290	.0091477	1.0673681	-.4910484	.0000000
23	.5000000	1.1384317	1.0689968	.0191655	1.0691686	-1.0271143	.0000000
24	.5000000	1.7076475	1.0717943	.0310898	1.0722451	-1.6615290	.0000000
25	.5000000	2.2768634	1.0757540	.0463715	1.0767530	-2.4682676	.0000000
26	.5000000	2.8460792	1.0809296	.0673610	1.0830264	-3.5659252	.0000000
27	.5000000	3.4152950	1.0873748	.0984435	1.0918219	-5.1730664	.0000000
28	.5000000	3.9845109	1.0949692	.1491651	1.1050827	-7.7575160	.0000000
29	.5000000	4.5537267	1.1024600	.2445272	1.1292627	-12.5081081	.0000000
30	.5000000	5.1229426	1.1077368	.4696878	1.2031988	-22.9772716	.0000000
31	1.0000000	.0000000	1.0814959	.0000000	1.0814959	.0000000	.0000000
32	1.0000000	.5472980	1.0824505	.0074334	1.0824760	-.3934539	.0000000
33	1.0000000	1.0945963	1.0853420	.0155676	1.0854936	-.8217344	.0000000
34	1.0000000	1.6418940	1.0905210	.0252099	1.0908124	-1.3242871	.0000000
35	1.0000000	2.1891923	1.0983595	.0374230	1.0989969	-1.9514087	.0000000
36	1.0000000	2.7364900	1.1098928	.0537873	1.1111953	-2.7744786	.0000000
37	1.0000000	3.2837879	1.1272250	.0769320	1.1298472	-3.9043250	.0000000
38	1.0000000	3.8310859	1.1552685	.1117421	1.1606600	-5.5246867	.0000000
39	1.0000000	4.3783839	1.2072065	.1684752	1.2189059	-7.9447651	.0000000
40	1.0000000	4.9256819	1.3228879	.2712187	1.3504044	-11.5862353	.0000000
41	1.5000000	.0000000	1.0930679	.0000000	1.0930679	.0000000	.0000000
42	1.5000000	.5370722	1.0943445	.0352192	1.0943570	-.2732558	.0000000
43	1.5000000	1.0741443	1.0982732	.0619400	1.0983277	-.5707109	.0000000

POTENTIAL FLOW - COOF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. 8F0C1 PSF =

OFF-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VT	VT	THETA	PHI
44	1.5000000	1.6112165	1.1051853	-.0177010	1.1053270	-.9175864	.0000000
45	1.5000000	2.1482886	1.1157653	-.0261169	1.1160709	-1.3408843	.0000000
46	1.5000000	2.6853608	1.1313244	-.0369116	1.1319264	-1.8687215	.0000000
47	1.5000000	3.2224329	1.1544044	-.0508766	1.1555250	-2.5234889	.0000000
48	1.5000000	3.7595051	1.1901917	-.0684415	1.1921579	-3.2911446	.0000000
49	1.5000000	4.2965772	1.2501509	-.0874109	1.2532031	-3.9996257	.0000000
50	1.5000000	4.8336493	1.3645391	-.0916974	1.3676167	-3.5445136	.0000000
51	1.6980000	.0000003	1.0964999	.0000000	1.0964999	.0000000	.0000000
52	1.6980000	.5354972	1.0978812	-.0042163	1.0978893	-.2200387	.0000000
53	1.6980000	1.0709944	1.1021280	-.0088533	1.1021635	-.4602424	.0000000
54	1.6980000	1.6064915	1.1095825	-.1143419	1.1096752	-.7405337	.0000000
55	1.6980000	2.1419887	1.1209418	-.0211240	1.1211409	-1.0796047	.0000000
56	1.6980000	2.6774859	1.1375048	-.0296134	1.1378902	-1.4912788	.0000000
57	1.6980000	3.2129831	1.1616735	-.0400007	1.1623620	-1.9721260	.0000000
58	1.6980000	3.7484923	1.1979654	-.0514842	1.1990711	-2.4608490	.0000000
59	1.6980000	4.2839774	1.2540434	-.0592342	1.2563405	-2.7023945	.0000000
60	1.6980000	4.8194746	1.3476230	-.0398122	1.3482109	-1.6921703	.0000000
61	2.6980000	.0000000	1.1014600	.0000000	1.1014600	.0000000	.0000000
62	2.6980000	.5304882	1.1031130	.0016475	1.1031142	.0855697	.0000000
63	2.6980000	1.0639764	1.1381263	.0032144	1.1081309	.1661983	.0000000
64	2.6980000	1.5914646	1.1166773	.0047012	1.1166872	.2412119	.0000000
65	2.6980000	2.1219528	1.1291025	.0062877	1.1291200	.3190653	.0000000
66	2.6980000	2.6524410	1.1459281	.0084766	1.1450594	.4238167	.0000000
67	2.6980000	3.1829292	1.1678213	.0123254	1.1678853	.6046879	.0000000
68	2.6980000	3.7134174	1.1952677	.0197832	1.1954314	.7482328	.0000000
69	2.6980000	4.2439057	1.2275540	.0338500	1.2280206	1.5795395	.0000000
70	2.6980000	4.7743939	1.2679968	.0571151	1.2622896	2.5933624	.0000000
71	3.6980000	.0000000	1.0832642	.0000000	1.0832642	.0000000	.0000000
72	3.6980000	.5394769	1.0850501	.0081546	1.0850807	.4305925	.0000000
73	3.6980000	1.0789537	1.0903412	.0162325	1.0904620	.8529328	.0000000
74	3.6980000	1.6184306	1.0989587	.0242936	1.0992272	1.2683762	.0000000
75	3.6980000	2.1579075	1.1106556	.0326398	1.1111351	1.6633176	.0000000
76	3.6980000	2.6973844	1.1251373	.0418740	1.1259162	2.1313790	.0000000
77	3.6980000	3.2368612	1.1420099	.0528982	1.1432344	2.6520613	.0000000
78	3.6980000	3.7763381	1.1606438	.0668156	1.1625654	3.2947502	.0000000
79	3.6980000	4.3158153	1.1800432	.0846714	1.1830770	4.1040954	.0000000
80	3.6980000	4.8552918	1.1989687	.1070868	1.2037415	5.1038713	.0000000
81	11.6000000	2.6458126	1.0779491	.0378474	1.0786133	2.0108632	.0000000
82	11.6000000	2.9904785	1.0503381	.0523626	1.0516425	2.8540101	.0000000
83	11.6000000	3.3351444	1.0288601	.0558580	1.0303748	3.1071604	.0000000
84	11.6000000	3.6798103	1.0116830	.0546139	1.0131560	3.0900119	.0000000
85	11.6000000	4.0244761	.9975126	.0510617	.9988187	2.9303588	.0000000
86	11.6000000	4.3691423	.9854253	.0461960	.9865075	2.6840156	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

OFF-BODY UNIFORM AXISYMMETRIC FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	Vt	THETA	PHI
07	11.6000000	4.7138079	.9747486	.0403708	.9755847	2.3216438	.0000000
88	11.6000000	5.0584738	.9649740	.0335468	.9655569	1.9910555	.0000000
89	11.6000000	5.4031397	.9556886	.0252990	.9560234	1.5163803	.0000000
90	11.6000000	5.7478055	.9464842	.0144163	.9465940	.8726298	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. AF001 PSF =

OFF-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
1	-.5000000	.0000000	.0563280	.0000000	.0563286	.0000000	.0000000
2	-.5000000	.7222227	.0564150	-.0034583	.0565209	-3.5079299	.0000000
3	-.5000000	1.4444444	.0565649	-.0071937	.0571193	-7.2321088	.0000000
4	-.5000000	2.1666666	.0570402	-.0114409	.0581763	-11.3416313	.0000000
5	-.5000000	2.8888889	.0574241	-.0166579	.0597914	-16.1767013	.0000000
6	-.5000000	3.6111111	.0574450	-.0236127	.0621096	-22.3447411	.0000000
7	-.5000000	4.3333333	.0558125	-.0337315	.0652139	-31.1476214	.0000000
8	-.5000000	5.0555555	.0473481	-.0489096	.0680734	-45.9293742	.0000000
9	-.5000000	5.7777777	.0170344	-.0576301	.0600949	-73.5332689	.0000000
10	-.5000000	6.4999999	-.0327080	-.0337595	.0338679	-94.5862064	.0000000
11	-.0000000	1.0000000	.0600865	.0000000	.0600865	.0000000	.0000000
12	.0000000	.6111111	.0611224	-.0027456	.0611841	-2.5720113	.0000000
13	.0000000	1.2222222	.0615079	-.0056761	.0617991	-5.2699041	.0000000
14	.0000000	1.8333333	.0622570	-.0088970	.0628895	-8.1329142	.0000000
15	.0000000	2.4444444	.0632337	-.0126467	.0645742	-11.2942163	.0000000
16	.0000000	3.0555555	.0648042	-.0173047	.0670749	-14.9509091	.0000000
17	.0000000	3.6666666	.0667750	-.0235769	.0708150	-19.4470792	.0000000
18	.0000000	4.2777777	.0692123	-.0330063	.0766796	-25.4957387	.0000000
19	.0000000	4.8888888	.0712531	-.0497586	.0869076	-34.9279699	.0000000
20	.0000000	5.4999999	.0516581	-.0905523	.1095511	-55.7486119	.0000000
21	.5000000	.0000000	.0652835	.0000000	.0652835	.0000000	.0000000
22	.5000000	.5692158	.0654597	.0022890	.0654997	2.0126940	.0000000
23	.5000000	1.1384317	.0660022	.0047216	.0661708	4.0217990	.0000000
24	.5000000	1.7076475	.0669570	.0073406	.0673582	6.2564017	.0000000
25	.5000000	2.2768634	.0684164	.0102948	.0691366	8.5572321	.0000000
26	.5000000	2.8460792	.0714507	.0137958	.0718869	11.0642874	.0000000
27	.5000000	3.4152950	.0736838	.0182019	.0758987	13.8758407	.0000000
28	.5000000	3.9845109	.0784813	.0242080	.0821300	17.1426907	.0000000
29	.5000000	4.5537267	.0865146	.0333760	.0927293	21.0958283	.0000000
30	.5000000	5.1229426	.1028286	.0494769	.1141126	25.6949556	.0000000
31	1.0000000	.0000000	.0690438	.0000000	.0690438	.0000000	.0000000
32	1.0000000	.5472980	.0692479	.0018573	.0692728	1.5363455	.0000000
33	1.0000000	1.0945962	.0698756	.0038233	.0699801	3.1318929	.0000000
34	1.0000000	1.6418940	.0709799	.0058913	.0712239	4.7446248	.0000000
35	1.0000000	2.1891923	.0726650	.0081372	.0731192	6.3894880	.0000000
36	1.0000000	2.7364900	.0751207	.0106453	.0758713	8.1656165	.0000000
37	1.0000000	3.2837879	.0786977	.0135162	.0798499	9.7453414	.0000000
38	1.0000000	3.8310859	.0840852	.0168575	.0857584	11.3364567	.0000000
39	1.0000000	4.3783839	.0927631	.0207159	.0950481	12.5887682	.0000000
40	1.0000000	4.9256819	.1100207	.0276244	.1108226	12.9112910	.0000000
41	1.5000000	.0000000	.0721375	.0000000	.0721375	.0000000	.0000000
42	1.5000000	.5370722	.0723520	.0014293	.0723661	1.1316990	.0000000
43	1.5000000	1.0741443	.0730253	.0029359	.0730843	2.3022757	.0000000

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFQCI PSF =

OFF-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
44	1.5000000	1.6112165	.0742004	-.0044720	.0743355	-3.4489557	.0000000
45	1.5000000	2.1482886	.0759719	-.0060574	.0762130	-4.5586478	.0000000
46	1.5000000	2.6853608	.0784988	-.0076804	.0788737	-5.5880924	.0000000
47	1.5000000	3.2224329	.0820524	-.0092717	.0825746	-6.4469514	.0000000
48	1.5000000	3.7595051	.0870933	-.0106064	.0877367	-6.9433887	.0000000
49	1.5000000	4.2965772	.0944205	-.0110188	.0950613	-6.6562846	.0000000
50	1.5000000	4.8336493	.1056748	-.0084258	.1060101	-4.5587593	.0000000
51	1.6980000	.0000000	.0731504	.0000000	.0731504	.0000000	.0000000
52	1.6980000	.5354972	.0733728	-.0012611	.0733837	-.9847085	.0000000
53	1.6980000	1.0709944	.0740543	-.0025878	.0740995	-2.0013385	.0000000
54	1.6980000	1.6064915	.0752394	-.0039204	.0753415	-2.9827717	.0000000
55	1.6980000	2.1419887	.0770122	-.0052595	.0771915	-3.9069466	.0000000
56	1.6980000	2.6774859	.0795138	-.0066568	.0797844	-4.7204307	.0000000
57	1.6980000	3.2129831	.0829690	-.0077268	.0833280	-5.3205673	.0000000
58	1.6980000	3.7484803	.0877243	-.0084535	.0881306	-5.5042924	.0000000
59	1.6980000	4.2839774	.0942649	-.0079966	.0946034	-4.8488337	.0000000
60	1.6980000	4.8194746	.1030136	-.0049918	.1030949	-2.2746374	.0000000
61	2.6980000	.0000000	.0764384	.0000000	.0764384	.0000000	.0000000
62	2.6980000	.5304882	.0766468	-.0004275	.0766480	-.3195335	.0000000
63	2.6980000	1.0639764	.0772764	-.0008858	.0772815	-.6567343	.0000000
64	2.6980000	1.5914646	.0783400	-.0012738	.0783503	-.9315481	.0000000
65	2.6980000	2.1219528	.0798580	-.0015461	.0798730	-1.1091627	.0000000
66	2.6980000	2.6524410	.0818542	-.0016137	.0818731	-1.1293749	.0000000
67	2.6980000	3.1829292	.0843375	-.0013341	.0843480	-.9067612	.0000000
68	2.6980000	3.7134174	.0872573	-.0004941	.0872587	-.3244609	.0000000
69	2.6980000	4.2439057	.0904048	.0011678	.0904123	.7400960	.0000000
70	2.6980000	4.7743939	.0932856	.0037818	.0933622	2.3215089	.0000000
71	3.6980000	.0000000	.0767916	.0000000	.0767916	.0000000	.0000000
72	3.6980000	.5394769	.0769769	.0003058	.0769776	.2275869	.0000000
73	3.6980000	1.0789537	.0775254	.0005762	.0775276	.4258738	.0000000
74	3.6980000	1.6184306	.0784161	.0009115	.0784214	.6659335	.0000000
75	3.6980000	2.1579075	.0796152	.0013503	.0796267	.9714813	.0000000
76	3.6980000	2.6973844	.0810753	.0019612	.0810990	1.3857213	.0000000
77	3.6980000	3.2368612	.0827264	.0028305	.0827748	1.9597430	.0000000
78	3.6980000	3.7763381	.0844663	.0040456	.0845632	2.7421764	.0000000
79	3.6980000	4.3158150	.0861559	.0056614	.0863417	3.7595763	.0000000
80	3.6980000	4.8552918	.0876471	.0076667	.0879818	4.9990599	.0000000
81	11.6000000	2.3458126	.0764527	-.0010900	.0764605	-.8168081	.0000000
82	11.6000000	2.9904785	.0751585	.0022892	.0751933	1.7446085	.0000000
83	11.6000000	3.3351444	.0738162	.0031368	.0738828	2.4333389	.0000000
84	11.6000000	3.6798103	.0726630	.0033236	.0727390	2.6189024	.0000000
85	11.6000000	4.0244761	.0716851	.0032238	.0717576	2.5749686	.0000000
86	11.6000000	4.3691420	.0708441	.0029749	.0709066	2.4045547	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY CASE NO. BF0C1 PSF =

OFF-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VI	THETA	PHI
87	11.6000000	4.7138079	.0700939	.0026251	.0701431	2.1448225	.0000000
88	11.6000000	5.0584738	.0694036	.0021738	.0694376	1.7940177	.0000000
89	11.6000000	5.4031397	.0687543	.0015820	.0687725	1.3181224	.0000000
90	11.6000000	5.7478055	.0681509	.0006926	.0681544	.5822360	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY CASE NO. BFQC1 PSF =

OFF-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
1	-.5000000	.0000000	-15.9397776	.0000000	15.9397776	180.0000019	.0000000
2	-.5000000	.7222222	-15.9661947	1.0417019	16.0001411	176.2670746	.0000000
3	-.5000000	1.4444444	-16.0430660	2.1530280	16.1868927	172.3564053	.0000000
4	-.5000000	2.1666666	-16.1601150	3.4214583	16.5183442	168.0457363	.0000000
5	-.5000000	2.8888889	-16.2849598	4.9794677	17.0292399	162.9978905	.0000000
6	-.5000000	3.6111111	-16.3129623	7.0586314	17.7746170	156.6018276	.0000000
7	-.5000000	4.3333333	-15.8715270	10.0948677	18.8098836	147.5421581	.0000000
8	-.5000000	5.0555555	-13.4349142	14.7078792	19.9203069	132.4101410	.0000000
9	-.5000000	5.7777777	-4.3383911	17.6056845	18.1323402	103.8430233	.0000000
10	-.5000000	6.4999999	1.9258882	17.4536344	18.6295586	79.5613661	.0000000
11	.0000000	.0000000	-17.3314838	.0000000	17.3314838	180.0000019	.0000000
12	.0000000	.6111111	-17.3724691	.8296130	17.3922067	177.2659397	.0000000
13	.0000000	1.2222222	-17.4976194	1.6996953	17.5799785	174.4517727	.0000000
14	.0000000	1.8333333	-17.7148249	2.6588781	17.9132535	171.4640026	.0000000
15	.0000000	2.4444444	-18.0382125	3.7755076	18.4290955	168.1783066	.0000000
16	.0000000	3.0555555	-18.4899008	5.1610594	19.1966915	164.4040642	.0000000
17	.0000000	3.6666666	-19.0980160	7.0246652	20.3489590	159.8053818	.0000000
18	.0000000	4.2777777	-19.8702292	9.8242776	22.1662455	153.6911983	.0000000
19	.0000000	4.8888888	-20.5989864	14.8065265	25.3683162	144.2914658	.0000000
20	.0000000	5.4999999	-18.1776121	27.1171918	32.6460972	123.8353453	.0000000
21	.5000000	.0000000	-18.6145983	.0000000	18.6145983	180.0000019	.0000000
22	.5000000	.5692158	-18.6672852	.6935838	18.6801658	177.8721523	.0000000
23	.5000000	1.1384317	-18.8296013	1.4141063	18.8826263	175.7051411	.0000000
24	.5000000	1.7076475	-19.1155045	2.1928092	19.2408659	173.4559994	.0000000
25	.5000000	2.2768634	-19.5529211	3.0706532	19.7925649	171.0749836	.0000000
26	.5000000	2.8460792	-20.1936214	4.1088494	20.6074011	168.4988823	.0000000
27	.5000000	3.4152950	-21.1359713	5.4110025	21.8176129	165.6401711	.0000000
28	.5000000	3.9845109	-22.5824165	7.1775004	23.6956122	162.3678818	.0000000
29	.5000000	4.5537267	-25.0122857	9.8538897	26.8833325	158.4974461	.0000000
30	.5000000	5.1229426	-29.9618511	14.4866191	33.2802439	154.1961346	.0000000
31	1.0000000	.0000000	-19.7372224	.0000000	19.7372224	180.0000019	.0000000
32	1.0000000	.5472980	-19.7979388	.5652604	19.8060067	178.3645668	.0000000
33	1.0000000	1.0945963	-19.9848974	1.1463422	20.0177476	176.7170868	.0000000
34	1.0000000	1.6418940	-20.3138201	1.7604242	20.3899577	175.0470428	.0000000
35	1.0000000	2.1891923	-20.8158100	2.4269279	20.9568107	173.3498764	.0000000
36	1.0000000	2.7364900	-21.5474291	3.1689754	21.7792127	171.6335011	.0000000
37	1.0000000	3.2837879	-22.6128669	4.0139026	22.9663424	169.9345379	.0000000
38	1.0000000	3.8310859	-24.2158706	4.9890176	24.7244551	168.3586559	.0000000
39	1.0000000	4.3783839	-26.7909815	6.0965231	27.4759076	167.1799469	.0000000
40	1.0000000	4.9256819	-31.2911239	7.2382872	32.1106496	167.0275364	.0000000
41	1.5000000	.0000000	-20.6598568	.0000000	20.6598568	180.0000019	.0000000
42	1.5000000	.5370722	-23.7249629	.4380825	20.7295923	178.7890682	.0000000
43	1.5000000	1.0741443	-20.9247360	.8824707	20.9433360	177.5850639	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. RFOC1 PSF =

OFF-BODY SIPIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
44	1.5000000	1.6112165	-21.2735207	1.3386143	21.3155944	176.3994694	.0000000
45	1.5000000	2.1482986	-21.7988141	1.8098984	21.8737378	175.2563801	.0000000
46	1.5000000	2.6853608	-22.5478852	2.2886245	22.6637359	174.2042923	.0000000
47	1.5000000	3.2224329	-23.6001308	2.7554439	23.7604427	173.3405571	.0000000
48	1.5000000	3.7595051	-25.0895865	3.1406216	25.2853882	172.8650379	.0000000
49	1.5000000	4.2965772	-27.2461581	3.2477248	27.4366837	173.2086735	.0000000
50	1.5000000	4.8336493	-30.5331926	2.4528118	30.6320355	175.3959560	.0000000
51	1.6980000	.0000000	-20.9642792	.0000000	20.9642792	180.0000019	.0000000
52	1.6980000	.5354972	-21.0302198	.3881726	21.0336018	178.9425640	.0000000
53	1.6980000	1.0709944	-21.2321658	.7793831	21.2464657	177.8977509	.0000000
54	1.6980000	1.6064915	-21.5832729	1.1751635	21.6152418	176.8834438	.0000000
55	1.6980000	2.1419887	-22.1083345	1.5725034	22.1641879	175.9318662	.0000000
56	1.6980000	2.6774859	-22.8486583	1.9586615	22.9324558	175.1003971	.0000000
57	1.6980000	3.2129831	-23.0698945	2.2989438	23.9803462	174.4987297	.0000000
58	1.6980000	3.7484803	-25.2722116	2.5063293	25.3961878	174.3363075	.0000000
59	1.6980000	4.2839774	-27.1935530	2.3587983	27.2956636	175.3425110	.0000000
60	1.6980000	4.8194746	-29.7508678	1.1962757	29.7749090	177.6973915	.0000000
61	2.6980000	.0000000	-21.9534793	.0000000	21.9534793	180.0000019	.0000000
62	2.6980000	.5304882	-22.0149283	.1418401	22.0153852	179.6308556	.0000000
63	2.6980000	1.0609764	-22.2004950	.2762915	22.2022142	179.2869759	.0000000
64	2.6980000	1.5914644	-22.5138636	.3932535	22.5172977	178.9993076	.0000000
65	2.6980000	2.1219529	-22.9608846	.4762702	22.9658234	178.8117027	.0000000
66	2.6980000	2.6524410	-23.5480556	.4985130	23.5533316	178.7872295	.0000000
67	2.6980000	3.1829292	-24.2773681	.4175536	24.2809584	179.0146503	.0000000
68	2.6980000	3.7134174	-25.1328752	.1718744	25.1334560	179.6114622	.0000000
69	2.6980000	4.2439057	-26.0516722	-.3175174	26.0536070	-179.3017159	.0000000
70	2.6980000	4.7743939	-26.8879397	-1.0838705	26.9097764	-177.6916199	.0000000
71	3.6980000	.0000000	-22.0774684	.0000000	22.0774684	180.0000019	.0000000
72	3.6980000	.5394769	-22.1318064	-.0736205	22.1319287	-179.8094101	.0000000
73	3.6980000	1.0789537	-22.2926903	-.1535164	22.2932189	-179.6054440	.0000000
74	3.6980000	1.6184306	-22.5539379	-.2488500	22.5553107	-179.3678513	.0000000
75	3.6980000	2.1579075	-22.9056206	-.3741975	22.9086769	-179.0640717	.0000000
76	3.6980000	2.6973844	-23.3334734	-.5501703	23.3399584	-178.6492977	.0000000
77	3.6980000	3.2368612	-23.8167233	-.8020090	23.8302228	-178.0713406	.0000000
78	3.6980000	3.7763381	-24.3248320	-1.1548215	24.3522291	-177.2819233	.0000000
79	3.6980000	4.3158150	-24.8165889	-1.6243846	24.8696945	-176.2550125	.0000000
80	3.6980000	4.8552918	-25.2483821	-2.2066857	25.3446298	-175.0050945	.0000000
81	11.6000000	2.6458126	-22.4884136	-.7891934	22.5022571	-177.9901257	.0000000
82	11.6000000	2.9904785	-21.9125426	-1.0915834	21.9397144	-177.1481419	.0000000
83	11.6000000	3.3351444	-21.4646664	-1.1640083	21.4962046	-176.8959465	.0000000
84	11.6000000	3.6798103	-21.1065302	-1.1379564	21.1371841	-176.9138927	.0000000
85	11.6000000	4.0244761	-20.8111172	-1.0636110	20.8382788	-177.0742836	.0000000
86	11.6000000	4.3691420	-20.5597562	-.9618282	20.5816426	-177.3214607	.0000000

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

OFF-BODY STRIP VORTEX FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VT	THETA	PHI
87	11.6000000	4.7118079	-23.3366148	-.8399565	20.3539536	-177.6348782	.0000000
88	11.6000000	5.0584738	-20.1328881	-.6969786	20.1449487	-178.0172759	.0000000
89	11.6000000	5.4031397	-19.9396064	-.5236151	19.9464803	-178.4957561	.0000000
90	11.6000000	5.7478055	-19.7491326	-.2925843	19.7512996	-179.1512241	.0000000

POTENTIAL FLOW - FODS RELEASE 2

DATE 053177

THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET PUNCHED WHEN THERE IS PUNCHED OUTPUT

[illegible]

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

.11024600+01	.11077368+01	.10814959+01	.10824505+01
.10853820+01	.10905210+01	.10983595+01	.11098928+01
.11272250+01	.11552685+01	.12072065+01	.13226879+01
.10930679+01	.10943445+01	.10982732+01	.11051853+01
.11157653+01	.11313244+01	.11544044+01	.11901917+01
.12501509+01	.13645391+01	.10964999+01	.10978812+01
.11021280+01	.11095825+01	.11209418+01	.11375048+01
.11616735+01	.11979654+01	.12549434+01	.13476230+01
.11014600+01	.11031130+01	.11081263+01	.11166773+01
.11291025+01	.11459281+01	.11678213+01	.11952677+01
.12275540+01	.12609968+01	.10832642+01	.10850501+01
.10903412+01	.10989587+01	.11106556+01	.11251373+01
.11420099+01	.11676438+01	.11800432+01	.11989687+01
.10779491+01	.10503381+01	.10288601+01	.10116830+01
.99731761+00	.98542532+00	.97474863+00	.96497396+00
.95568861+00	.94648418+00		
.56328593-01	.56414951-01	.56664880-01	.57040244-01
.57424078-01	.57445943-01	.55812487-01	.47348112-01
.17034423-01	.27080420-02	.60986467-01	.61122436-01
.61537895-01	.62256981-01	.63323712-01	.64804232-01
.66774972-01	.69212321-01	.71253182-01	.61658110-01
.65283481-01	.65459698-01	.66002164-01	.66957004-01
.68416361-01	.70550669-01	.73683783-01	.78481251-01
.86514603-01	.10282864+00	.69043849-01	.69247864-01
.69875564-01	.70979878-01	.72665021-01	.75120747-01
.78697770-01	.84085207-01	.92763089-01	.10802069+00
.72132494-01	.72351966-01	.73325275-01	.74200835-01
.75971860-01	.78498848-01	.82052425-01	.87093268-01
.94420534-01	.10567475+00	.73150396-01	.73372826-01
.74054308-01	.75239383-01	.77312159-01	.79513755-01
.82968988-01	.87724257-01	.94264869-01	.10301365+00
.76438375-01	.76646835-01	.77276383-01	.78339972-01
.79858009-01	.81854153-01	.84337462-01	.87257285-01
.90404801-01	.93285620-01	.76791570-01	.76976947-01
.77525422-01	.78416072-01	.79615213-01	.81075266-01
.82726393-01	.84466331-01	.86155884-01	.87647106-01
.76452687-01	.75158492-01	.73816195-01	.72663002-01
.71685143-01	.70844125-01	.70093930-01	.69403555-01
.68754312-01	.68150884-01		
.15939778+02	.15966195+02	.16043066+02	.16160115+02
.16284965+02	.16312962+02	.15871527+02	.13434914+02
.43383911+01	.19258882+01	.17331484+02	.17372409+02
.17497619+02	.17714825+02	.18038213+02	.18489901+02
.19098016+02	.19870229+02	.20598986+02	.18177612+02
.18614598+02	.18667285+02	.18829601+02	.19115505+02
.19552921+02	.20193621+02	.21135971+02	.22582417+02
.25012286+02	.29961851+02	.19737222+02	.19797939+02
.19984897+02	.20313820+02	.20815010+02	.21547429+02
.22612861+02	.24215871+02	.26790982+02	.31291124+02
.20659857+02	.20724963+02	.20924736+02	.21273521+02
.21798814+02	.22547885+02	.23600131+02	.25089586+02
.27246158+02	.30533193+02	.20964279+02	.21030220+02
.21232166+02	.21543273+02	.22108335+02	.22848658+02
.23869805+02	.25272212+02	.27193553+02	.29750864+02
.21953479+02	.22014928+02	.22200495+02	.22513864+02
.22967885+02	.23548056+02	.24277368+02	.25132875+02
.26051672+02	.26887940+02	.22077468+02	.22131806+02

POTENTIAL FLOW - FOOD RELEASE 2

DATE 053177

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 .17605685+02 .10453634+02 .00000000 .82961296+00
 .16996953+01 .26588781+01 .37755076+01 .51610594+01
 .70246652+01 .98242776+01 .14806527+02 .27117192+02
 .00000000 .69358384+00 .14141063+01 .21926092+01

POTENTIAL FLOW - FOOD RELEASE 2

DATE 053177

.30706532+01	.41088494+01	.54110025+01	.71775004+01
.98538897+01	.14486619+02	.00000000	.56526037+00
.11463422+01	.17604242+01	.24269279+01	.31689754+01
.40139026+01	.49890176+01	.60966231+01	.72082872+01
.00000000	.43838253+00	.88247071+00	.13386143+01
.18088984+01	.22886245+01	.27554439+01	.31406216+01
.32447248+01	.24588118+01	.03000000	.38817257+00
.77938306+00	.11751635+01	.15725034+01	.19586615+01
.22989438+01	.25063293+01	.23587983+01	.11962757+01
.00000000	.14184007+00	.27629148+00	.39325351+00
.47627021+00	.49851297+00	.41755357+00	.17087439+00
.31751737+00	.10838705+01	.00000000	.73620513+01
.15351643+00	.24885005+00	.37419750+00	.55617027+00
.80203896+00	.11548215+01	.16243846+01	.22066857+01
.78919335+00	.10915834+01	.11640083+01	.11379564+01
.10636110+01	.96182823+00	.83995651+00	.69697861+00
.52361510+00	.29258426+00		

POTENTIAL FLOW - EOPF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BF0C1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
1	8.0110000	.0000000							
	8.0152385	.1151024	.1140952	.1157871	.99742	.07174	.0009309	.0000000	-.1017751
2	8.0275149	.2296225							
	8.0482578	.3442699	.1088069	.1144066	.97723	.21217	.0027213	-.0000001	-.3048832
3	8.0769252	.4571968							
	8.1128740	.5668563	.0985504	.1120928	.93964	.34216	.0042526	-.0000000	-.5033157
4	8.1558563	.6739545							
	8.2057551	.7786680	.0852680	.1090259	.88942	.45709	.0054206	.0000002	-.6937730
5	8.2618482	.8801982							
	8.3240924	.9789353	.0708848	.1053331	.83099	.55629	.0062294	.0000005	-.8756208
6	8.3916585	1.0741090							
	8.4645996	1.1662226	.0567095	.1012605	.76826	.64013	.0067116	.0000001	-1.0481304
7	8.5420380	1.2545890							
	8.6241082	1.3397385	.0436620	.0969623	.70414	.71006	.0069300	-.0000002	-1.2098344
8	8.7099422	1.4210927							
	8.7967980	1.4967089	.0323666	.0927147	.64148	.76714	.0069537	.0000004	-1.3579420
9	8.8865939	1.5682088							
	8.9802898	1.6383442	.0228493	.0885948	.58112	.81382	.0068498	.0000004	-1.4931454
10	9.0764732	1.7043962							
	9.1759719	1.7676933	.0148264	.0846039	.52235	.85273	.0066631	.0000004	-1.6181396
11	9.2775625	1.8275751							
	9.3819519	1.8846013	.0081655	.0807948	.46548	.88506	.0064289	.0000004	-1.7323351
12	9.4880913	1.9382993							
	9.5965809	1.9890973	.0026667	.0771800	.41060	.91182	.0061712	.0000006	-1.8355789
13	9.7065265	2.0366619							
	9.8184350	2.0813177	-.0018873	.0738036	.35762	.93387	.0059065	-.0000001	-1.9277090
14	9.9315463	2.1228321							
	10.0462868	2.1614498	-.0056866	.0706314	.30639	.95191	.0056429	-.0000005	-2.0087836
15	10.1620110	2.1970111							
	10.2790741	2.2296982	-.0088942	.0676801	.25669	.96649	.0053830	.0000002	-2.0787914
16	10.3969290	2.2594033							
	10.5158712	2.2862603	-.0116095	.0649014	.20830	.97807	.0051290	-.0000002	-2.1378784
17	10.6354350	2.3101971							
	10.7558620	2.3313097	-.0139003	.0623091	.16095	.98696	.0048788	-.0000006	-2.1860478
18	10.8767570	2.3495523							
	10.9983147	2.3649888	-.0157652	.0598836	.11442	.99343	.0046327	-.0000002	-2.2233647
19	11.1201990	2.3775911							
	11.2425621	2.3873996	-.0171307	.0576231	.06845	.99765	.0043948	.0000007	-2.2498303
20	11.3651180	2.3943955							
	11.4880365	2.3981811	-.0179366	.0555637	.02279	.99974	.0042005	.0000005	-2.2649292
21	11.6109999	2.4000000							
	11.7385459	2.4000000	-.0180606	.0536363	.00000	1.00000	.0041096	-.0000003	-2.2712730
22	11.8660920	2.4000000							
	12.0191474	2.4000000	-.0178361	.0515409	.00000	1.00000	.0039881	.0000001	-2.2763019

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQCI PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
23	12.1722019	2.4000000							
	12.3558694	2.4000000							
24	12.5395360	2.4000000	-.0174912	.0490578	.00000	1.00000	.0037967	-.0000012	-2.2822613
	12.7599355	2.4000000	-.0167487	.0461714	.00000	1.00000	.0035524	.0000001	-2.2891886
25	12.9803350	2.4000000							
	13.2448145	2.4000000	-.0154594	.0429099	.00000	1.00000	.0032691	-.0000002	-2.2970163
26	13.5092940	2.4000000							
	13.8266695	2.4000000	-.0135062	.0393924	.00000	1.00000	.0029649	-.0000002	-2.3054563
27	14.1440450	2.4000000							
	14.5248954	2.4000000	-.0108174	.0356487	.00000	1.00000	.0026649	-.0000006	-2.3139632
28	14.9057460	2.4000000							
	15.3627670	2.4000000	-.0073880	.0326669	.00000	1.00000	.0024037	-.0000006	-2.3215995
29	15.8197880	2.4000000							
	16.3242929	2.4000000	-.0034143	.0305061	.00000	1.00000	.0022297	-.0000010	-2.3267853
30	16.8287981	2.4000000							
	17.3333035	2.4000000	.0037648	.0299483	.00000	1.00000	.0021812	.0000003	-2.3281240
31	17.8378091	2.4000000							
	18.3423140	2.4000000	.0050832	.0311693	.00000	1.00000	.0022667	.0000000	-2.3251938
32	18.8468189	2.4000000							
	19.3513243	2.4000000	.0097445	.0342689	.00000	1.00000	.0024907	-.0000005	-2.3177547
33	19.8558300	2.4000000							
	20.3603354	2.4000000	.0150111	.0394451	.00000	1.00000	.0028665	-.0000002	-2.3053316
34	20.8648410	2.4000000							
	21.3693459	2.4000000	.0211954	.0470140	.00000	1.00000	.0034164	-.0000004	-2.2871640
35	21.8738511	2.4000000							
	22.3783565	2.4000000	.0286663	.0574398	.00000	1.00000	.0041741	-.0000020	-2.2621344
36	22.8828621	2.4000000							
	23.3873670	2.4000000	.0378778	.0713528	.00000	1.00000	.0051855	-.0000017	-2.2287532
37	23.8918719	2.4000000							
	24.3963773	2.4000000	.0493851	.0895970	.00000	1.00000	.0065119	-.0000014	-2.1849671
38	24.9008830	2.4000000							
	25.4053879	2.4000000	.0638757	.1132774	.00000	1.00000	.0082346	-.0000011	-2.1261342
39	25.9098930	2.4000000							
	26.4143984	2.4000000	.0822027	.1438206	.00000	1.00000	.0104586	-.0000008	-2.0548306
40	26.9189041	2.4000000							
	27.4234090	2.4000000	.1135402	.1830505	.00000	1.00000	.0133213	-.0000012	-1.9606787
41	27.9279139	2.4000000							
	28.4324193	2.4000000	.1347067	.2332659	.00000	1.00000	.0170005	-.0000017	-1.8401618
42	28.9369249	2.4000000							
	29.4414299	2.4000000	.1713968	.2973033	.00000	1.00000	.0217313	-.0000013	-1.6864720
43	29.9459350	2.4000000							
	30.4504404	2.4000000	.2164361	.3784906	.00000	1.00000	.0278280	-.0000016	-1.4916220
44	30.9549460	2.4000000							
	31.4594514	2.4000000	.2693010	.4803131	.00000	1.00000	.0357203	-.0000021	-1.2472466

POTENTIAL FLOW - FODF RELEASE 2

DATE C53177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

Z-BODY CASE NO. 9F0C1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
45	31.9639571	2.4000000							
	32.4684620	2.4000000	.3249609	.6352461	.00000	1.00000	.0460014	-.0000011	-.9474094
46	32.9729671	2.4000000							
	33.4774718	2.4000000	.3666666	.7515570	.00000	1.00000	.0594442	-.0000058	-.5962392
47	33.9819770	2.4000000							
	34.4864821	2.4000000	.3501757	.9355276	.00000	1.00000	.0768696	-.0000004	-.2267338
48	34.9909878	2.4000000							
	35.4954939	2.4000000	.1286936	1.0195507	.00000	1.00000	.0954204	-.0000009	.0469216
49	36.0000000	2.4000000							
50	36.0000000	6.0000000							
	35.4954939	6.0000000	-1.4737899	.6619967	.00000	-1.00000	-.9045679	.0000001	-1.9080197
51	34.9909878	6.0000000							
	34.4864821	6.0000000	-.8956349	.4916277	.00000	-1.00000	-1.2708815	-.0000007	-3.0502338
52	33.9819770	6.0000000							
	33.4774718	6.0000000	-.6019819	.3707557	.00000	-1.00000	-1.5014176	.0000005	-3.7754660
53	32.9729671	6.0000000							
	32.4684620	6.0000000	-.4391908	.2851543	.00000	-1.00000	-1.6638459	.0000006	-4.2890745
54	31.9639571	6.0000000							
	31.4594514	6.0000000	-.3321297	.2212719	.00000	-1.00000	-1.7850879	-.0000001	-4.6723685
55	30.9549460	6.0000000							
	30.4504404	6.0000000	-.2553711	.1724547	.00000	-1.00000	-1.8782487	-.0000005	-4.9652718
56	29.9459350	6.0000000							
	29.4414299	6.0000000	-.1978966	.1347312	.00000	-1.00000	-1.9509993	-.0000000	-5.1916127
57	28.9369249	6.0000000							
	28.4324193	6.0000000	-.1538853	.1054304	.00000	-1.00000	-2.0083576	-.0000004	-5.3674178
58	27.9279139	6.0000000							
	27.4234090	6.0000000	-.1197779	.0825253	.00000	-1.00000	-2.0538340	.0000001	-5.5042485
59	26.9189041	6.0000000							
	26.4143984	6.0000000	-.0931686	.0648758	.00000	-1.00000	-2.0899865	-.0000013	-5.6107455
60	25.9098930	6.0000000							
	25.4053879	6.0000000	-.0723020	.0510812	.00000	-1.00000	-2.1187263	-.0000012	-5.6935128
61	24.9008830	6.0000000							
	24.3963773	6.0000000	-.0558645	.0403963	.00000	-1.00000	-2.1414976	-.0000021	-5.7576220
62	23.8918719	6.0000000							
	23.3873670	6.0000000	-.0428299	.0321686	.00000	-1.00000	-2.1594019	-.0000008	-5.8069883
63	22.8828621	6.0000000							
	22.3783565	6.0000000	-.0324086	.0258943	.00000	-1.00000	-2.1732759	-.0000004	-5.8446343
64	21.8738511	6.0000000							
	21.3693459	6.0000000	-.0239545	.0211936	.00000	-1.00000	-2.1837513	-.0000007	-5.8728384
65	20.8648410	6.0000000							
	20.3603354	6.0000000	-.0169579	.0177824	.00000	-1.00000	-2.1912957	-.0000012	-5.8933053
66	19.8558300	6.0000000							

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

19.3513243	6.0000000	-0.0109883	.0154517	.00000	-1.00000	-2.1962432	-.0000007	-5.9072900
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POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. 6F0C1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	K	PHI
67	18.2468189	6.0000000							
	18.3423140	6.0000000	-.0056721	.0140622	.00000	-1.00000	-2.1988124	-.0000032	-5.9156265
68	17.8378091	6.0000000							
	17.3333035	6.0000000	-.0006856	.0135305	.00000	-1.00000	-2.1991208	-.0000026	-5.9188172
69	16.8227981	6.0000000							
	16.3242929	6.0000000	.0043232	.0138311	.00000	-1.00000	-2.1971897	-.0000025	-5.9170132
70	15.8197880	6.0000000							
	15.3227670	6.0000000	.0094691	.0149233	.00000	-1.00000	-2.1931916	-.0000025	-5.9104603
71	14.9057460	6.0000000							
	14.5248954	6.0000000	.0146339	.0165702	.00000	-1.00000	-2.1878562	-.0000019	-5.9004589
72	14.1440450	6.0000000							
	13.8266695	6.0000000	.0198777	.0195825	.00000	-1.00000	-2.1819423	-.0000013	-5.8883063
73	13.5092940	6.0000000							
	13.2448145	6.0000000	.0254584	.0207644	.00000	-1.00000	-2.1758504	-.0000007	-5.8754135
74	12.9203350	6.0000000							
	12.7599355	6.0000000	.0317074	.0230585	.00000	-1.00000	-2.1698346	-.0000002	-5.8616488
75	12.5395360	6.0000000							
	12.3558494	6.0000000	.0391239	.0254299	.00000	-1.00000	-2.1640826	-.0000004	-5.8474205
76	12.1722029	6.0000000							
	12.0191474	6.0000000	.0440356	.0278896	.00000	-1.00000	-2.1589854	-.0000005	-5.8326685
77	11.8660920	6.0000000							
	11.7385459	6.0000000	.0495332	.0306512	.00000	-1.00000	-2.1566217	-.0000022	-5.8160926
78	11.6109999	6.0000000							
	11.4849260	5.9993708	.0446253	.0342063	-.00763	-.99997	-2.1527596	-.0000015	-5.7941543
79	11.3588570	5.9980749							
	11.2336416	5.9957247	.0501443	.0367103	-.02232	-.99975	-2.1333258	-.0000017	-5.7756200
80	11.1080460	5.9924832							
	10.9840175	5.9884013	.0295126	.0381591	-.03613	-.99935	-2.0964085	-.0000026	-5.7598892
81	10.8596190	5.9834879							
	10.7359110	5.9777992	.0212648	.0391790	-.04906	-.99880	-2.0469943	-.0000016	-5.7435951
82	10.6122410	5.9713367							
	10.4891906	5.9641594	.0159693	.0399236	-.06114	-.99813	-1.9878267	-.0000018	-5.7260485
83	10.3611840	5.9562637							
	10.2417539	5.9477100	.0126279	.0405073	-.07239	-.99738	-1.9215511	-.0000017	-5.7067846
84	10.1213320	5.9384915							
	9.9994266	5.9286683	.0107955	.0409950	-.08283	-.99656	-1.8505643	-.0000025	-5.68156227
85	9.8775721	5.9182321							
	9.7561605	5.9072418	.0101707	.0414489	-.09246	-.99572	-1.7769654	-.0000029	-5.6623929
86	9.6348013	5.8956888							
	9.5138347	5.8836297	.0105756	.0419112	-.10131	-.99485	-1.7024917	-.0000028	-5.6370400
87	9.3929205	5.8710566							
	9.2723523	5.8580235	.0118738	.0424335	-.10940	-.99400	-1.6285269	-.0000013	-5.6094470
88	9.1518356	5.8445236							
	9.0316215	5.8306089	.0139817	.0430542	-.11673	-.99316	-1.5561182	-.0000017	-5.5795758

POTENTIAL FLOW - FOOD RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
69	8.9114568	5.8162720							
	8.7915541	5.8015628	.0168250	.0438024	-.12332	-.99237	-1.4860305	-.0000014	-5.5474406
90	8.6716980	5.7864783							
	8.5520655	5.7710621	.0204027	.0447135	-.12918	-.99162	-1.4187810	-.0000015	-5.5130176
91	8.4324759	5.7553149							
	8.3130736	5.7392761	.0246624	.0458135	-.13432	-.99084	-1.3546928	-.0000021	-5.4763396
92	8.1937102	5.7229496							
	8.0744991	5.7063711	.0296279	.0471460	-.13876	-.99033	-1.2939359	-.0000020	-5.4373384
93	7.9553225	5.6895475							
	7.8362648	5.6725104	.0353214	.0487347	-.14250	-.98979	-1.2365653	-.0000020	-5.3960625
94	7.7172364	5.6552734							
	7.5982949	5.6378548	.0417633	.0506183	-.14555	-.98935	-1.1825506	-.0000013	-5.3524764
95	7.4793769	5.6202781							
	7.3605146	5.6025631	.0469981	.0528389	-.14791	-.98900	-1.1318024	-.0000016	-5.3065299
96	7.2416701	5.5847288							
	7.1228507	5.5667928	.05171015	.0554320	-.14958	-.98875	-1.0841899	-.0000011	-5.2582145
97	7.0040429	5.5487792							
	6.8852304	5.5306991	.05661051	.0584432	-.15053	-.98860	-1.0395481	-.0000013	-5.2074671
98	6.7664229	5.5125853							
	6.6475802	5.4944441	.06161582	.0619291	-.15090	-.98855	-.9977139	-.0000003	-5.1541784
99	6.5287375	5.4763030							
	6.4099004	5.4581881	.0677053	.0659338	-.15054	-.98860	-.9585104	-.0000002	-5.0983088
100	6.2910579	5.4401098							
	6.1722546	5.4221053	.0696214	.0705093	-.14950	-.98876	-.9217732	-.0000001	-5.0397966
101	6.0534394	5.4041809							
	5.9346336	5.3863657	.1132867	.0757351	-.14779	-.98902	-.8873269	-.0000000	-4.9784287
102	5.8158097	5.3686723							
	5.6969648	5.3511245	.1284343	.0816735	-.14539	-.98937	-.8549844	.0000001	-4.9140794
103	5.5780960	5.3337401							
	5.4591755	5.3165385	.1452402	.0884048	-.14231	-.98982	-.8245690	.0000005	-4.8465307
104	5.3402255	5.2995417							
	5.2211922	5.2827654	.1638902	.0960281	-.13853	-.99036	-.7959083	.0000005	-4.7754716
105	5.1021244	5.2662359							
	4.9829406	5.2499650	.1845993	.1046375	-.13406	-.99097	-.7688401	.0000009	-4.7006218
106	4.8637178	5.2339833							
	4.7443452	5.2182993	.2076370	.1143471	-.12889	-.99166	-.7432088	-.0000000	-4.6216019
107	4.6249295	5.2029475							
	4.5053288	5.1879333	.2332813	.1252869	-.12300	-.99241	-.7188636	.0000003	-4.5379530
108	4.3856817	5.1732945							
	4.2658126	5.1590343	.2616887	.1376003	-.11639	-.99320	-.6956623	.0000003	-4.4491496
109	4.1458942	5.1451945							
	4.0257148	5.1317750	.2938510	.1514462	-.10955	-.99404	-.6734690	.0000001	-4.3545872
110	3.9054843	5.1188215							
	3.7849513	5.1053317	.3296501	.1670139	-.10095	-.99489	-.6521543	.0000003	-4.2535031

POTENTIAL FLOW - EGDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

*2-BODY CASE NO. 0F0C1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
111	3.6643663	5.0943546							
	3.5434346	5.0028863	.3698583	.1845374	-.39210	-.99575	-.6315992	-.0000002	-4.1450563
112	3.4224512	5.0719786							
	3.3010736	5.0616266	.4151837	.2041695	-.38248	-.99659	-.6116913	.0000000	-4.0281968
113	3.1796457	5.0518844							
	3.0577727	5.0427473	.4665316	.2262841	-.07206	-.99740	-.5923225	.0000002	-3.9016539
114	2.9358520	5.0342705							
	2.8134310	5.0264587	.5250779	.2511750	-.06284	-.99815	-.5733682	.0000002	-3.7639318
115	2.6909667	5.0193437							
	2.5679423	5.0129486	.5924533	.2792460	-.34880	-.99881	-.5546447	-.0000001	-3.6131025
116	2.4448805	5.0073702							
	2.3211935	5.0024623	.6739850	.3139871	-.33592	-.99935	-.5358060	-.0000005	-3.4467607
117	2.1974770	4.9984267							
	2.0730640	4.9952242	.7658252	.3470451	-.02219	-.99975	-.5161494	.0000001	-3.2616563
118	1.9486315	4.9929924							
	1.8233214	4.9912016	.8816608	.3882354	-.00759	-.99997	-.4929606	.0000001	-3.0534405
119	1.6980000	4.9910000							
	1.6122447	4.9923773	1.0249070	.4282709	.02530	-.99968	-.4660549	.0000002	-2.8542874
120	1.5265295	4.9953400							
	1.4451099	5.0004653	1.1780337	.4641756	.07516	-.99717	-.4452452	.0000003	-2.6793715
121	1.3638420	5.0076025							
	1.2867347	5.0162761	1.2980373	.5016849	.12396	-.99229	-.4294235	.0000002	-2.4996859
122	1.2098634	5.0268385							
	1.1370124	5.0386738	1.4302784	.5402189	.17284	-.98500	-.4154849	.0000004	-2.3166854
123	1.0644770	5.0523051							
	.9958170	5.0669929	1.5683420	.5795383	.22163	-.97513	-.4024929	-.0000000	-2.1304765
124	.9275536	5.0834258							
	.8630218	5.1007380	1.7147315	.6194818	.27196	-.96231	-.3898260	.0000002	-1.9409239
125	.7989744	5.1197639							
	.7385202	5.1395319	1.8717134	.6599396	.32423	-.94593	-.3770077	.0000002	-1.7477513
126	.6786504	5.1610051							
	.6222442	5.1831179	2.0417148	.7008558	.37921	-.92531	-.3635982	.0000003	-1.5504997
127	.5665420	5.2069486							
	.5141859	5.2313510	2.2276461	.7422115	.43766	-.89914	-.3491249	.0000002	-1.3485820
128	.4626816	5.2575035							
	.4154019	5.2836321	2.4291258	.7836078	.49976	-.86617	-.3330522	.0000002	-1.1433369
129	.3691185	5.3114873							
	.3262277	5.3396325	2.6479151	.8248927	.56589	-.82443	-.3150018	.0000004	-.9350888
130	.2845438	5.3695362							
	.2462618	5.3996399	2.8861560	.8663548	.63658	-.77121	-.2940277	.0000001	-.7216359
131	.2090780	5.4315221							
	.1760383	5.4634863	3.1421092	.9079318	.71141	-.70277	-.2691003	-.0000001	-.5030138
132	.1445518	5.4972162							
	.1176815	5.5294433	3.3997217	.9456308	.78674	-.61728	-.2397985	.0000001	-.2840430

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POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

2N-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGNA	N	PHI
133	.0927733	5.5632098							
	.0710843	5.5969337	3.6498350	.9883181	.85888	-.51218	-.2062538	.0000001	-.0653830
134	.0517239	5.6320462							
	.0356628	5.6669440	3.8801607	1.0278149	.92349	-.38363	-.1677184	-.0000001	.1576255
135	.0222693	5.7029500							
	.0122057	5.7384667	4.0779324	1.0669064	.97252	-.23365	-.1264641	-.0000001	.3839402
136	.0050333	5.7746781							
	.0010348	5.8072249	4.3086671	1.1041358	.99724	-.07683	-.0879574	-.0000001	.6047403
137	.0000000	5.8400000							
	.0027027	5.8743638	4.5953121	1.1423435	.98884	.14901	-.0157325	.0000002	.8361775
138	.0102465	5.9079982							
	.0232597	5.9373530	4.4573578	1.1820509	.88255	.47022	.1195481	.0000002	1.0809003
139	.0403651	5.9646276							
	.0596903	5.9879149	3.9178016	1.2160127	.73832	.67445	.2107172	.0000001	1.2934657
140	.0812386	6.0092714							
	.1021562	6.0271011	3.4101417	1.2432111	.62532	.78037	.2605698	.0000002	1.4658577
141	.1241164	6.0436297							
	.1491852	6.0603449	2.9971844	1.2667705	.54000	.84167	.2896805	.0000007	1.6167746
142	.1750100	6.0762820							
	.2038299	6.0922922	2.6466760	1.2893538	.46974	.88281	.3094068	.0000004	1.7628278
143	.2332099	6.1072499							
	.2655795	6.1224563	2.3532172	1.3109792	.41206	.91115	.3232510	.0000004	1.9039567
144	.2983746	6.1367220							
	.3342397	6.1512396	2.1065070	1.3317612	.36425	.93130	.3333956	.0000003	2.0407428
145	.3704374	6.1649070							
	.4098453	6.1788353	1.8969804	1.3518226	.32392	.94609	.3412129	.0000004	2.1738538
146	.4495205	6.1919830							
	.4925903	6.2053987	1.7168610	1.3712862	.28933	.95723	.3475727	.0000003	2.3039707
147	.5358801	6.2180863							
	.5827839	6.2310433	1.5601403	1.3902481	.25919	.96583	.3530473	.0000005	2.4316530
148	.6298728	6.2433105							
	.6808255	6.2558419	1.4222470	1.4087994	.23251	.97259	.3580310	.0000004	2.5573842
149	.7319366	6.2677103							
	.7871896	6.2792304	1.2996996	1.4270760	.20855	.97801	.3628088	.0000004	2.6815254
150	.8425804	6.2913041							
	.9024184	6.3030287	1.1898101	1.4449346	.18673	.98241	.3676046	.0000004	2.8044268
151	.9623779	6.3140746							
	1.0271180	6.3253413	1.0904862	1.4626340	.16659	.98603	.3726003	.0000007	2.9263179
152	1.0919661	6.3359682							
	1.1619567	6.3467551	1.0000767	1.4801509	.14773	.98903	.3779572	.0000006	3.0474001
153	1.2320445	6.3568910							
	1.3076668	6.3671342	.9172558	1.4975363	.12982	.99154	.3838243	.0000007	3.1678803
154	1.3833770	6.3767759							
	1.4650454	6.3863122	.8407532	1.5148353	.11254	.99365	.3903452	.0000009	3.2878990

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POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

Douglas Aircraft Company
Long Beach Division

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQCI PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
155	1.5467935	6.3952146							
	1.6349574	6.4040580	.7702754	1.5320995	.09555	.99542	.3976713	.0000007	3.4075960
156	1.7231938	6.4121473							
	1.8183392	6.4200526	.7044856	1.5493998	.07846	.99692	.4059772	.0000008	3.5271754
157	1.9135500	6.4271276							
	2.0162014	6.4338492	.6427977	1.5668233	.06071	.99816	.4154992	.0000009	3.6466558
158	2.1189107	6.4396189							
	2.2296323	6.4447989	.5876447	1.5845188	.04138	.99914	.4265348	.0000012	3.7671060
159	2.3404030	6.4487910							
	2.4606907	6.4515117	.5308812	1.6028419	.01749	.99985	.4421157	.0000011	3.8892415
160	2.5810000	6.4530000							
	2.7100000	6.4530000	.4646285	1.6216712	.00000	1.00000	.4657537	.0000013	4.0116441
161	2.8390000	6.4530000							
	2.9680000	6.4530000	.4209578	1.6393376	.00000	1.00000	.4863063	.0000012	4.1256456
162	3.0970000	6.4530000							
	3.2260000	6.4530000	.3833988	1.6553823	.00000	1.00000	.5055309	.0000016	4.2291821
163	3.3550000	6.4530000							
	3.4839574	6.4530000	.3516475	1.6700600	.00000	1.00000	.5248081	.0000012	4.3236972
164	3.6129949	6.4530000							
	3.7419949	6.4530000	.3245450	1.6835666	.00000	1.00000	.5446340	.0000014	4.4110553
165	3.8709999	6.4530000							
	3.9999999	6.4530000	.3005757	1.6960512	.00000	1.00000	.5653073	.0000013	4.4916185
166	4.1269999	6.4530000							
	4.2579998	6.4530000	.2793110	1.7076337	.00000	1.00000	.5870554	.0000016	4.5663603
167	4.3869998	6.4530000							
	4.5159998	6.4530000	.2602861	1.7184123	.00000	1.00000	.6100757	.0000017	4.6359144
168	4.6449998	6.4530000							
	4.7739998	6.4530000	.2431485	1.7284693	.00000	1.00000	.6345528	.0000016	4.7008124
169	4.9029998	6.4530000							
	5.0319998	6.4530000	.2276211	1.7378732	.00000	1.00000	.6606683	.0000019	4.7614955
170	5.1609997	6.4530000							
	5.2899997	6.4530000	.2134812	1.7466854	.00000	1.00000	.6886053	.0000017	4.8183610
171	5.4189997	6.4530000							
	5.5479996	6.4530000	.2005498	1.7549564	.00000	1.00000	.7185516	.0000016	4.8717334
172	5.6769996	6.4530000							
	5.8059996	6.4530000	.1886753	1.7627323	.00000	1.00000	.7507011	.0000018	4.9219118
173	5.9349996	6.4530000							
	6.0639995	6.4530000	.1777342	1.7703524	.00000	1.00000	.7852543	.0000020	4.9691485
174	6.1929995	6.4530000							
	6.3219995	6.4530000	.1676201	1.7769511	.00000	1.00000	.8224179	.0000028	5.0136656
175	6.4509995	6.4530000							
	6.5799995	6.4530000	.1582432	1.7834615	.00000	1.00000	.8624024	.0000023	5.0556768
176	6.7089995	6.4530000							
	6.8374995	6.4530000	.1495243	1.7896105	.00000	1.00000	.9054189	.0000020	5.0953566

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BFQC1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
177	6.9669994	6.4530000							
	7.0959994	6.4530000	.1413979	1.7954225	.00000	1.00000	.9516726	.0000021	5.1328614
178	7.2249994	6.4530000							
	7.3539994	6.4530000	.1338082	1.8309205	.00000	1.00000	1.0013559	.0000028	5.1603402
179	7.4829993	6.4530000							
	7.6119993	6.4530000	.1266973	1.8061261	.00000	1.00000	1.0546345	.0000026	5.2019314
180	7.7409993	6.4530000							
	7.8699992	6.4530000	.1200237	1.8110560	.00000	1.00000	1.1116320	.0000032	5.2337441
181	7.9989992	6.4530000							
	8.1279991	6.4530000	.1137393	1.8157279	.00000	1.00000	1.1724082	.0000029	5.2638920
182	8.2569991	6.4530000							
	8.3859991	6.4530000	.1078185	1.8201575	.00000	1.00000	1.2369296	.0000039	5.2924765
183	8.5149990	6.4530000							
	8.6439990	6.4530000	.1022191	1.8243578	.00000	1.00000	1.3050357	.0000038	5.3195808
184	8.7729989	6.4530000							
	8.9019989	6.4530000	.0969126	1.8283421	.00000	1.00000	1.3763937	.0000045	5.3452916
185	9.0309988	6.4530000							
	9.1599988	6.4530000	.0916731	1.8321227	.00000	1.00000	1.4504493	.0000038	5.3696877
186	9.2889987	6.4530000							
	9.4179987	6.4530000	.0870900	1.8357076	.00000	1.00000	1.5263722	.0000039	5.3928340
187	9.5469986	6.4530000							
	9.6759986	6.4530000	.0825310	1.8391132	.00000	1.00000	1.6030035	.0000041	5.4147977
188	9.8049985	6.4530000							
	9.9339982	6.4530000	.0781887	1.8423423	.00000	1.00000	1.6788126	.0000038	5.4356328
189	10.0629981	6.4530000							
	10.1919980	6.4530000	.0740661	1.8454047	.00000	1.00000	1.7518789	.0000043	5.4553965
190	10.3209980	6.4530000							
	10.4499979	6.4530000	.0701486	1.8483093	.00000	1.00000	1.8199112	.0000048	5.4741402
191	10.5789980	6.4530000							
	10.7079979	6.4530000	.0664554	1.8510635	.00000	1.00000	1.8803348	.0000039	5.4919129
192	10.8369980	6.4530000							
	10.9659979	6.4530000	.0630423	1.8536724	.00000	1.00000	1.9304726	.0000053	5.5087481
193	11.0949980	6.4530000							
	11.2239980	6.4530000	.0602608	1.8561448	.00000	1.00000	1.9679354	.0000050	5.5247027
194	11.3529980	6.4530000							
	11.4819984	6.4530000	.0581722	1.8584901	.00000	1.00000	1.9917539	.0000046	5.5398366
195	11.6109979	6.4530000							
	11.7399979	6.4530000	.0553378	1.8607115	.00000	1.00000	2.0044218	.0000069	5.5541716
196	11.8690000	6.4530000							
	12.0237999	6.4530000	.0514572	1.8630157	.00000	1.00000	2.0116857	.0000058	5.5690400
197	12.1786000	6.4530000							
	12.3643600	6.4530000	.0470793	1.8655887	.00000	1.00000	2.0174501	.0000062	5.5856442
198	12.5501200	6.4530000							
	12.7730319	6.4530000	.0426506	1.8684198	.00000	1.00000	2.0230547	.0000053	5.6039127

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POTENTIAL FLOW - EODF RELEASE 2

DATE CS3177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

* 2-BODY CASE NO. BFOCI PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
199	12.9959440	6.4530000							
	13.2634380	6.4530000	.0378041	1.8714706	.00000	1.00000	2.5287588	.0000060	5.6235999
200	13.5309319	6.4530000							
	13.8519255	6.4530000	.0323629	1.8746645	.00000	1.00000	2.0344959	.0000045	5.6442103
201	14.1729190	6.4530000							
	14.5581110	6.4530000	.0262640	1.8778643	.00000	1.00000	2.0400133	.0000034	5.6648582
202	14.9433030	6.4530000							
	15.4055330	6.4530000	.0194257	1.8808542	.00000	1.00000	2.0449665	.0000020	5.6841524
203	15.8677630	6.4530000							
	16.3710690	6.4530000	.0120898	1.8832016	.00000	1.00000	2.0486118	.0000036	5.6993002
204	16.8743751	6.4530000							
	17.3776810	6.4530000	.0047657	1.8845120	.00000	1.00000	2.0503102	.0000030	5.7077560
205	17.8809869	6.4530000							
	18.3842928	6.4530000	-.0024293	1.8846944	.00000	1.00000	2.0499340	.0000030	5.7089327
206	18.8875990	6.4530000							
	19.3909049	6.4530000	-.0096805	1.8837565	.00000	1.00000	2.0474599	.0000027	5.7028804
207	19.8942111	6.4530000							
	20.3975165	6.4530000	-.0171903	1.8816706	.00000	1.00000	2.0427760	.0000024	5.6894206
208	20.9008219	6.4530000							
	21.4041278	6.4530000	-.0251813	1.8783837	.00000	1.00000	2.0356762	.0000021	5.6682101
209	21.9074340	6.4530000							
	22.4107399	6.4530000	-.0338870	1.8738019	.00000	1.00000	2.0259479	.0000016	5.6386437
210	22.9140460	6.4530000							
	23.4173520	6.4530000	-.0436044	1.8677913	.00000	1.00000	2.0128549	.0000021	5.5998574
211	23.9206581	6.4530000							
	24.4239640	6.4530000	-.0546882	1.8601703	.00000	1.00000	1.9961080	.0000011	5.5506788
212	24.9272699	6.4530000							
	25.4305758	6.4530000	-.0676141	1.8506905	.00000	1.00000	1.9748285	.0000016	5.4895056
213	25.9338820	6.4530000							
	26.4371874	6.4530000	-.0829944	1.8390226	.00000	1.00000	1.9479924	.0000024	5.4142128
214	26.9404931	6.4530000							
	27.4437990	6.4530000	-.1016938	1.8247230	.00000	1.00000	1.9142579	.0000011	5.3219374
215	27.9471049	6.4530000							
	28.4504108	6.4530000	-.1249541	1.8071892	.00000	1.00000	1.8718507	.0000032	5.2087917
216	28.9537170	6.4530000							
	29.4570229	6.4530000	-.1546363	1.7855825	.00000	1.00000	1.8183978	.0000023	5.0693640
217	29.9603291	6.4530000							
	30.4636350	6.4530000	-.1937183	1.7587060	.00000	1.00000	1.7506424	.0000016	4.8959297
218	30.9669411	6.4530000							
	31.4702466	6.4530000	-.2473034	1.7247624	.00000	1.00000	1.6639274	.0000019	4.6768920
219	31.9735520	6.4530000							
	32.4768577	6.4530000	-.3252062	1.6808923	.00000	1.00000	1.5511266	.0000021	4.3937982
220	32.9801641	6.4530000							
	33.4834700	6.4530000	-.499603	1.6220351	.00000	1.00000	1.4000548	.0000009	4.0139922

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. 9F0C1 PSF =

ON-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	T2	T3	SIN A	COS A	SIGMA	N	PHI
221	33.9867759	6.4530000							
	34.4900818	6.4530000	-0.6889676	1.5374299	.00000	1.00000	1.1856893	.0000013	3.4680348
222	34.9933882	6.4530000							
	35.4966941	6.4530000	-1.1993895	1.3981304	.00000	1.00000	.8453332	.0000007	2.5691355
223	36.0000000	6.4530000							

ADDED MASS = 6573.8681641

VOLUME = 1335.0665936

POTENTIAL FLOW - CODE RELEASE 2

DATE 053177

THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET PUNCHED WHEN THERE IS PUNCHED OUTPUT

.11409518+00 .10886690+00 .98550394-01 .85267998-01
.70884794-01 .56709498-01 .43662034-01 .32366559-01
.22849306-01 .14886439-01 .81554824-02 .26667006-02
-18873438-02 .56865923-02 .88941716-02 .11609541-01
-13900304-01 .15765240-01 .17130731-01 .17936612-01
-18060576-01 .17836114-01 .17491231-01 .16748720-01
-15459358-01 .13506151-01 .10817426-01 .73880056-02
-34143288-02 .76483056-03 .50832191-02 .97445281-02
.15011118-01 .21195447-01 .28566263-01 .37877786-01
.49385082-01 .63875706-01 .82202705-01 .10540622+00
.13470670+00 .17139681+00 .21643697+00 .26930103+00
.32496093+00 .36666656+00 .35017522+00 .12869359+00
-14737899-01 .89563487+00 .60198188+00 .43919077+00
-33212972+00 .25537110+00 .19789664+00 .15388533+00
-11977786+00 .93168617-01 .72332044-01 .55854509-01
-42829894-01 .32408640-01 .23954506-01 .16957948-01
-10788278-01 .56720918-02 .68564666-03 .43232082-02
.94691063-02 .14633904-01 .19877739-01 .25458357-01
.31707438-01 .39123923-01 .48735622-01 .79533237-01
.74625253-01 .40144337-01 .29512584-01 .21264784-01
.15969335-01 .12627943-01 .10795477-01 .10170737-01
.10575647-01 .11873811-01 .13981674-01 .16824976-01
.20402696-01 .24662370-01 .29627923-01 .35321413-01
.41763304-01 .48998063-01 .57101514-01 .66105111-01
-76158157-01 .87305283-01 .99621359-01 .11328666+00
.12843428+00 .14524025+00 .16389017+00 .18459929+00
.20763705+00 .23328133+00 .26188971+00 .29385097+00
.32965009+00 .36985831+00 .41518370+00 .46653164+00
.52507790+00 .59245334+00 .67098504+00 .76580523+00
.88166076+00 .10249070+01 .11700337+01 .12980373+01
.14302784+01 .15683420+01 .17147315+01 .18717134+01
.20417148+01 .22276461+01 .24291258+01 .26479151+01
.28661564+01 .31421092+01 .33997217+01 .36496350+01
.38801617+01 .40779324+01 .43786671+01 .46595312+01
.44573578+01 .39178016+01 .34101417+01 .29971844+01
.26466960+01 .23532172+01 .21065070+01 .18969804+01
.17162610+01 .15601403+01 .14222470+01 .12996996+01
.11898101+01 .10904862+01 .10000787+01 .91725580+00
.84095319+00 .77027540+00 .70448565+00 .64279766+00
.58764467+00 .53088120+00 .46462852+00 .42095782+00
.38339882+00 .35184747+00 .32454504+00 .30057568+00
.27931104+00 .26028606+00 .24314854+00 .22762119+00
.21346120+00 .20054979+00 .18867530+00 .17773419+00
.16762012+00 .15824318+00 .14452430+00 .14139788+00
.13380815+00 .12669734+00 .12002372+00 .11373929+00
.10781849+00 .10221913+00 .96912592-01 .91877108-01
.87089966-01 .82530973-01 .78198669-01 .74068068-01
.70148655-01 .66455350-01 .63742279-01 .60260782-01
.58172173-01 .55337759-01 .51457158-01 .47079348-01
.42650642-01 .37804105-01 .32362849-01 .26264008-01
.19425675-01 .12089820-01 .47657113-02 .24292532-02
-96804611-02 .17190283-01 .25181254-01 .33887018-01
-43604433-01 .54688239-01 .67614075-01 .82994433-01

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

.10169383+00	.12495409+00	.15463334+00	.19371825+00
.24730335+00	.32520021+00	.44996034+00	.66896759+00
.11993695+01			
.11578710+00	.11440660+00	.11209284+00	.10902587+00
.10533306+00	.10126045+00	.96962258+01	.92714682+01
.88594824+01	.84603091+01	.80794781+01	.77179953+01
.73803559+01	.70631400+01	.67680135+01	.64901441+01
.62309146+01	.59883639+01	.57523088+01	.55563748+01
.53636253+01	.51540881+01	.49257811+01	.46171427+01
.42909897+01	.39392382+01	.35848662+01	.32666892+01
.30506119+01	.29948329+01	.31169266+01	.34268856+01
.39445147+01	.47013998+01	.57439804+01	.71352810+01
.89597031+01	.11327742+00	.14382060+00	.18305045+00
.23326592+00	.29730333+00	.37849084+00	.48031308+00
.60524610+00	.75156781+00	.90552761+00	.10195507+01
.68199672+00	.49162771+00	.37375567+00	.28515425+00
.22127192+00	.17245470+00	.13673122+00	.10543036+00
.82625255+01	.64875752+01	.51081195+01	.40396333+01
.32168612+01	.25894284+01	.21193594+01	.17782450+01
.15451670+01	.14062241+01	.13530463+01	.13831139+01
.14923289+01	.16590178+01	.18582284+01	.20764410+01
.23058534+01	.25429919+01	.27884581+01	.30651242+01
.34206346+01	.36710277+01	.38154102+01	.39178982+01
.39923638+01	.43507257+01	.40994972+01	.43448936+01
.41911155+01	.42433500+01	.43054208+01	.43802366+01
.44712527+01	.45813531+01	.47146022+01	.48734665+01
.51618261+01	.52838892+01	.55431977+01	.58443248+01
.61929062+01	.65933838+01	.70509270+01	.75735092+01
.81673518+01	.88404849+01	.96028060+01	.10463749+00
.11434717+00	.12528689+00	.13760029+00	.15144618+00
.16701393+00	.18450737+00	.22416950+00	.22628407+00
.25117503+00	.27924605+00	.31098714+00	.34704506+00
.38823439+00	.43827041+00	.46417557+00	.50168495+00
.54021891+00	.57953830+00	.61948176+00	.65993960+00
.70085579+00	.74221154+00	.78360778+00	.82489267+00
.84535482+00	.90793176+00	.94863382+00	.98831079+00
.10278149+01	.10669064+01	.11341358+01	.11423435+01
.11820509+01	.12160127+01	.12432111+01	.12667705+01
.12893538+01	.13109792+01	.13317612+01	.13518226+01
.13712862+01	.13902481+01	.14087994+01	.14270060+01
.14449346+01	.14626340+01	.14801509+01	.14975763+01
.15148353+01	.15320925+01	.15493998+01	.15668233+01
.15845188+01	.16028419+01	.16216712+01	.16393376+01
.16553823+01	.16700600+01	.16835666+01	.16960512+01
.17076337+01	.17184122+01	.17284693+01	.17378732+01
.17466844+01	.17549564+01	.17627323+01	.17700524+01
.17769511+01	.17834615+01	.17896105+01	.17954225+01
.18009205+01	.18061261+01	.18110560+01	.18157279+01
.18201575+01	.18243578+01	.18283421+01	.18321227+01
.18357046+01	.18391132+01	.18423420+01	.18454047+01
.18483093+01	.18510635+01	.18536724+01	.18561448+01
.18584901+01	.18607115+01	.18630157+01	.18655887+01
.18684150+01	.18714706+01	.18746645+01	.18778643+01
.18828542+01	.18832016+01	.18845120+01	.18846944+01
.18837565+01	.18816706+01	.18783837+01	.18738019+01
.18677913+01	.18601703+01	.18506905+01	.18390226+01
.18247230+01	.18071892+01	.17855825+01	.17587060+01

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

.17247624+01 .16808923+01 .16220351+01 .15374299+01
.13981304+01

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.3

2-BODY CASE NO. BFQC1 PSF =

OFF-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VZ	PHI
1	-.5000000	.0000000	.0000000	.8064446	.8064446	.0000000
2	-.5000000	.7222222	-.0851439	.8119302	.8083949	-.1383815
3	-.5000000	1.4444444	-.1735406	.8300357	.8141312	-.2684771
4	-.5000000	2.1666666	-.2687938	.8644395	.8246205	-.3799889
5	-.5000000	2.8888888	-.3749115	.9242969	.8413814	-.4582314
6	-.5000000	3.6111111	-.4948252	1.0299726	.8674894	-.4785107
7	-.5000000	4.3333333	-.6188942	1.2305389	.9093884	-.3926502
8	-.5000000	5.0555555	-.6426461	1.6407097	.9811263	-.0954171
9	-.5000000	5.7777777	.0003217	2.1056465	1.0984997	.5691096
10	-.5000000	6.4999999	.5999459	1.5132775	1.1816481	1.1820124
11	.0000000	.0000000	.0000000	.7446028	.7446028	.0000000
12	.0000000	.6111111	-.0797065	.7474942	.7456441	-.1554397
13	.0000000	1.2222222	-.1624112	.7570235	.7426919	-.3071543
14	.0000000	1.8333333	-.2516458	.7744160	.7541201	-.4507797
15	.0000000	2.4444444	-.3521733	.8028913	.7624695	-.5806301
16	.0000000	3.0555555	-.4712822	.8488665	.7747822	-.6881655
17	.0000000	3.6666666	-.6213967	.9264291	.7929910	-.7590332
18	.0000000	4.2777777	-.8259246	1.0713000	.8212179	-.7647899
19	.0000000	4.8888888	-1.1311668	1.4012444	.8698562	-.6362595
20	.0000000	5.4999999	-1.4856172	2.5755534	.9776317	-.1230254
21	.5000000	.0000000	.0000000	.6775147	.6775147	.0000000
22	.5000000	.5692158	-.0789960	.6787834	.6781696	-.1831910
23	.5000000	1.1384317	-.1609200	.6833721	.6794832	-.3648865
24	.5000000	1.7076475	-.2492287	.6913695	.6820196	-.5429984
25	.5000000	2.2768634	-.3486085	.7037499	.6857923	-.7154079
26	.5000000	2.8460792	-.4663101	.7221957	.6911097	-.8791264
27	.5000000	3.4152953	-.6150741	.7496771	.6984272	-1.0299601
28	.5000000	3.9845109	-.8206532	.7918474	.7085355	-1.1613436
29	.5000000	4.5537267	-1.1455809	.8593385	.7228334	-1.2621546
30	.5000000	5.1229426	-1.7923649	.9523843	.7432041	-1.3155508
31	1.0000000	.0000000	.0000000	.6075080	.6075080	.0000000
32	1.0000000	.5472980	-.0777250	.6074562	.6076289	-.2147439
33	1.0000000	1.0945960	-.1581107	.6079956	.6077136	-.4293952
34	1.0000000	1.6418940	-.2442469	.6083759	.6078701	-.6438358
35	1.0000000	2.1891920	-.3401505	.6082547	.6079995	-.8581645
36	1.0000000	2.7364900	-.4516888	.6076465	.6079217	-1.0729184
37	1.0000000	3.2837979	-.5882946	.6001762	.6072459	-1.2897212
38	1.0000000	3.8310859	-.7665540	.5820171	.6051595	-1.5126680
39	1.0000000	4.3783839	-1.0179502	.5306718	.5996130	-1.7530479
40	1.0000000	4.9256819	-1.3795792	.3786549	.5850365	-2.0439780
41	1.5000000	.0000000	.0000000	.5371677	.5371677	.0000000
42	1.5000000	.5370722	-.0751903	.5359491	.5369580	-.2486870
43	1.5000000	1.0741443	-.1525946	.5331074	.5358749	-.4985373

POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

OFF-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VZ	PHI
44	1.5000000	1.6112165	-.2347021	.5272873	.5340785	-.7507004
45	1.5000000	2.1482486	-.5245164	.5173539	.5312518	-1.0070065
46	1.5000000	2.6853608	-.4259542	.5006494	.5269465	-1.2703192
47	1.5000000	3.2224729	-.5442644	.4719621	.5203938	-1.5454989
48	1.5000000	3.7595051	-.6861697	.4204634	.5101697	-1.8415194
49	1.5000000	4.2965772	-.8579109	.3223797	.4935126	-2.1761620
50	1.5000000	4.8336493	-1.0551419	.1212812	.4647340	-2.5872880
51	1.6980000	.0000000	.0000000	.5097785	.5097785	.0000000
52	1.6980000	.5354972	-.0738221	.5082492	.5093995	-.2627152
53	1.6980000	1.0709944	-.1496486	.5041540	.5079699	-.5269615
54	1.6980000	1.6064915	-.2296856	.4962719	.5055190	-.7943795
55	1.6980000	2.1419887	-.3164961	.4831598	.5017024	-1.0673479
56	1.6980000	2.6774859	-.4131970	.4619001	.4960394	-1.3493473
57	1.6980000	3.2129831	-.5234776	.4270271	.4876872	-1.6460523
58	1.6980000	3.7484403	-.6508522	.3679702	.4751045	-1.9672607
59	1.6980000	4.2839774	-.7947421	.2638246	.4559089	-2.3308739
60	1.6980000	4.8194746	-.9330656	.1718866	.4250304	-2.7710515
61	2.6980000	.0000000	.0000000	.3811340	.3811340	.0000000
62	2.6980000	.5304482	-.0627459	.3783852	.3803447	-.3287198
63	2.6980000	1.0609764	-.1262553	.3704314	.3776408	-.6603084
64	2.6980000	1.5914646	-.1912237	.3561286	.3730523	-.9977650
65	2.6980000	2.1219528	-.2581045	.3341005	.3662514	-1.3447846
66	2.6980000	2.6524410	-.3268145	.3020507	.3568003	-1.7060280
67	2.6980000	3.1829292	-.3961704	.2567404	.3441202	-2.0876190
68	2.6980000	3.7134174	-.4624112	.1941317	.3273928	-2.4976714
69	2.6980000	4.2439057	-.5182244	.1104116	.3057396	-2.9463758
70	2.6980000	4.7743939	-.5508929	.0074036	.2784758	-3.4448609
71	3.6980000	.0000000	.0000000	.2761263	.2761263	.0000000
72	3.6980000	.5394769	-.0493820	.2730163	.2752379	-.3909924
73	3.6980000	1.0789537	-.0985992	.2640426	.2721650	-.7853002
74	3.6980000	1.6184306	-.1473479	.2484905	.2670593	-1.1062136
75	3.6980000	2.1574075	-.1949812	.2256420	.2597278	-1.5974390
76	3.6980000	2.6973444	-.2402891	.1946515	.2499528	-2.0231656
77	3.6980000	3.2368612	-.2812508	.1546612	.2375320	-2.4680032
78	3.6980000	3.7763381	-.3148427	.1153252	.2222794	-2.9360360
79	3.6980000	4.3158150	-.3371736	.0475444	.2041264	-3.4348430
80	3.6980000	4.8552918	-.3443050	-.0158324	.1832377	-3.9656191
81	11.6000000	2.6458126	-.0179944	.0048421	.0498203	-2.5139974
82	11.6000000	2.9934785	-.0186802	.0099980	.0449523	-2.8560497
83	11.6000000	3.3351444	-.0199347	.0135945	.0415385	-3.1966074
84	11.6000000	3.6798103	-.0216025	.0161984	.0390529	-3.5361030
85	11.6000000	4.0244761	-.0236707	.0181962	.0371824	-3.8748364
86	11.6000000	4.3691420	-.0262490	.0198772	.0357510	-4.2129410

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POTENTIAL FLOW - EDDF RELEASE 2

DATE 053177

DOUGLAS AIRCRAFT COMPANY
LONG BEACH DIVISION

TEST CASE RELEASE 2.0

2-BODY CASE NO. BF0C1 PSF =

OFF-BODY UNIFORM CROSS FLOW
TRANSFORMED COORDINATES

	X	Y	VX	VY	VZ	PHI
87	11.6000000	4.7138079	-.0295959	.0218590	.0346472	-4.5509879
88	11.6000000	5.0584738	-.0342771	.0231071	.0338119	-4.8874375
89	11.6000000	5.4031397	-.0417557	.0252876	.0331977	-5.2237679
90	11.6000000	5.7478055	-.0569475	.0281739	.0328095	-5.5592518

POTENTIAL FLOW - EOPF RELEASE 2

DATE 053177

THE FOLLOWING NUMBERS ARE THE CARD IMAGES THAT GET PUNCHED WHEN THERE IS PUNCHED OUTPUT

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.00000000 -.85143926-01-.17354064+00-.26879381+00
-.37491148+00-.49482523+00-.61889422+00-.64260612+00
.32167671-03-.59994587+00-.00000000 -.79736472-01
-.16241118+00-.25164577+00-.35217328+00-.47128225+00
-.62139667+00-.82592460+00-.11311666+01-.14856172+01
.00000000 -.78996035-01-.16092000+00-.24922266+00
-.34860846+00-.46631005+00-.61527411+00-.82065324+00
-.11455809+01-.17923649+01-.00000000 -.77724960-01
-.15811073+00-.24424695+00-.34015046+00-.45168877+00
-.58829457+00-.76655402+00-.10179502+01-.13995792+01
.00000000 -.75190304-01-.15259460+00-.23470213+00
-.32451642+00-.42595424+00-.54426444+00-.68616968+00
-.85791091+00-.10551419+01-.00000000 -.73822051-01
-.14964861+00-.22968557+00-.31649607+00-.41319700+00
-.52347754+00-.6085217+00-.79474214+00-.93306560+00
.00000000 -.62745922-01-.12525535+00-.19122373+00
-.25810451+00-.32681493+00-.39612000+00-.46246718+00
-.51822978+00-.55089286+00-.00000000 -.49381966-01
-.98599222-01-.14734791+00-.19498116+00-.24028906+00
-.28125078+00-.31484273+00-.33717358+00-.34430499+00
-.17994388-01-.18680215-01-.19934701-01-.21602513-01
-.23670679-01-.26248994-01-.29595892-01-.34277149-01
-.41755331-01-.56947480-01
.80644462+00 .81193022+00 .83003566+00 .86443947+00
.92429692+00 .10299726+01 .12305389+01 .16407097+01
.21056465+01 .15132775+01 .74460284+00 .74749424+00
.75702353+00 .77441630+00 .80289131+00 .84886651+00
.92642914+00 .10713000+01 .14012444+01 .25755534+01
.67751466+00 .67878343+00 .68337211+00 .69136949+00
.70374985+00 .72219574+00 .74967708+00 .79184739+00
.85933846+00 .95238426+00 .60750799+00 .60745621+00
.60799558+00 .60837577+00 .60825467+00 .60646647+00
.60017616+00 .58201711+00 .53067178+00 .37865485+00
.53716770+00 .53594914+00 .53310741+00 .52728729+00
.51735392+00 .50064938+00 .47196211+00 .42046335+00
.32237969+00 .12128124+00 .50977851+00 .50824921+00
.50415395+00 .49627189+00 .48315975+00 .46190014+00
.42702709+00 .36797020+00 .26382460+00 .71886644+01
.38113403+00 .37838519+00 .37043139+00 .35613865+00
.33410048+00 .30205068+00 .25674041+00 .19410168+00
.11061159+00 .74035525-02 .27612627+00 .27301627+00
.26404262+00 .24849054+00 .22564198+00 .19465148+00
.15466122+00 .10532521+00 .47544360-01-.15832365-01
.48421472-02 .99980086-02 .13594508-01 .16198426-01
.18196195-01 .19877240-01 .21459028-01 .23187131-01
.25287822-01 .28173923-01
.80644462+00 .80839491+00 .81413124+00 .2462057+00
.84138145+00 .86748935+00 .9093884+00 .98112629+00
.10984997+01 .11818481+01 .74460284+00 .74564411+00
.74869193+00 .75412014+00 .76246950+00 .77478221+00
.79299095+00 .82121794+00 .86985601+00 .97763175+00
.67751466+00 .67816959+00 .67948319+00 .68201961+00
.68579234+00 .69110966+00 .69842720+00 .70853548+00

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POTENTIAL FLOW - EODF RELEASE 2

DATE 053177

.72283040+00	.74320409+00	.60750799+00	.60762887+00
.60771355+00	.60777030+00	.60799946+00	.60792169+00
.60724588+00	.60515948+00	.59961303+00	.58503655+00
.53716770+00	.53695798+00	.53587895+00	.53407849+00
.53125176+00	.52694654+00	.52039377+00	.51016974+00
.49351265+00	.46473403+00	.50977851+00	.50939952+00
.50796993+00	.50551902+00	.50170238+00	.49603944+00
.48768722+00	.47518446+00	.45590892+00	.42503038+00
.38113403+00	.38034470+00	.37764080+00	.37305234+00
.36625141+00	.35680830+00	.34412017+00	.32739276+00
.30573957+00	.27847578+00	.27612627+00	.27523795+00
.27216505+00	.26705934+00	.25972776+00	.24995281+00
.23753197+00	.22227940+00	.20412643+00	.18323773+00
.49820304-01	.44952273-01	.41538537-01	.39052889-01
.37182406-01	.35750955-01	.34647152-01	.33811852-01
.33197701-01	.32804459-01		

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POTENTIAL FLOW - FODF RELEASE 2

DATE 053177

MATRIX SUMMATIONS FOR FINAL SOLUTIONS TOOK

.000 SECONDS

NO ADDITIONAL CASES INPUT. NORMAL PROGRAM TERMINATION.

#FIN

Program COMBYE

(a) Printed Output (including input data)

SOLUTION COMBINATION - COMBYN RELEASE 2-0

DATE 062377

TEST CASE RELEASE 2.0											
221	90	221	90	1	0	0	0				
.000	746.140	-90.000	458.180	12.030	6.450	.000	.000	914.410	24.060		
.000	.000	11.740	.100								
2	81	90	-1	0	1	0	0				
.000	180.000										
11.50	2.40	6.30									
.0000	.0000	5.8000	48								

SOLUTION COMBINATION = COMSYN RELEASE 2-D

DATE 062377

COMPRESSIBLE COMBYN APPROACH 5

TEST CASE RELEASE 2.0

INLET GEOMETRY IDENT= 3FQC1

LINEAR COMBINATION OF THE FOLLOWING BASIC FLOWS

A. UNIFORM AXISYMMETRIC (DUCT OPEN)

B. STRIP VORTEX ON SHROUD

C. UNIFORM CROSSFLOW (DUCT OPEN)

CURVED ELEMENTS (IGEDMF=0)

PIECEWISE-PARABOLIC SOURCE DENSITIES (ISIGF=0)

INTERNALLY-COMPUTED ELEMENT CURVATURES (ICURVN=0)

NEW VELOCITY FORMULAE ARE USED.

	VELOCITY	MACH	DYNAMIC PRESSURE		PRESSURE RATIO		DENSITY RATIO
		NO	INC.	COMP.	INC.	COMP.	
CONTROL	5.467+02	5.360-01	1.332+02	1.513+02	8.544-01	8.224-01	8.696-01
BULK	5.467+02	5.360-01	1.332+02	1.513+02	8.544-01	8.224-01	8.696-01
FREE	7.461+02	7.504-01	2.490+02	2.4 02	7.289-01	6.883-01	7.658-01
STREAM							

ALFAP	VINF/VC	VINF/VA	VC/VA	VSONIC	VSONICC	WDOTCR
-9.009+01	1.365+00	1.365+00	1.000+00	6.070+02	9.575+02	2.554+01

TSTAT	PSTAT	PSTATC	ASTAT	RHOSTAT	WDOT	VIC
4.118+02	5.996+02	6.294+02	9.944+02	8.909-04	1.174+01	4.755+02

TTOT	PTOT	PTOTC	ATOT	RHOTOT	THEY	DEL
9.582+02	9.144+02	9.144+02	1.049+03	1.163-03	8.834-01	4.321-01

XRI	YRIHUB	YRISHR	HUB-TIP RATIO	LND	P-S PLOT CUTOFF
0.000	0.000	5.860+00	4.000-01	1.000+00	2.406+01

XTEST	YTESTH	YTESTS	YMWING
1.160+01	2.400+00	6.000+00	6.450+00

NI	NI	NCL0	NCHI	NHUBMX	NX	KND	KSKIP	NOTHET	ISWIRL
1 221	1	90	81	90	48	-1	0	0	1
2 221	2	90							0

V1	V2	A	B	C	VINFP
9.897-01	-2.055+01	5.714+02	4.352+00	5.669-07	5.714+02

1 OF 2 THEYAS

THETA =	.00000	WDOTT =	1.17400+01	VICT =	4.75459+02	V3 =	-3.34406-02
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HUB
ON-BODY POINTS

I	X	Y	VP	VTHETA	VRES	VBARI	BETA	S	H	RB/RT	PSOPTC
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1	.8015+01	.1151+00	.4748+02	.0000	.4748+02	.4442+03	.0000	.9667+02	.4528+01	.8908	.9986
2	.8048+01	.3843+00	.1834+03	.0000	.1434+03	.4441+03	.0000	.2891-01	.1370+00	.8908	.9870
3	.8113+01	.5669+00	.2356+03	.0000	.2356+03	.4450+03	.0000	.4828-01	.2258+00	.8903	.9651
4	.8206+01	.7787+00	.3195+03	.0000	.3195+03	.4470+03	.0000	.6741-01	.3075+00	.8890	.9365
5	.8324+01	.9787+00	.3932+03	.0000	.3932+03	.4493+03	.0000	.8674-01	.3803+00	.8876	.9050
6	.8465+01	.1165+01	.4559+03	.0000	.4559+03	.4519+03	.0000	.1062+00	.4432+00	.8859	.8739
7	.8624+01	.1340+01	.5079+03	.0000	.5079+03	.4547+03	.0000	.1258+00	.4960+00	.8841	.8451
8	.8797+01	.1497+01	.5495+03	.0000	.5495+03	.4575+03	.0000	.1452+00	.5389+00	.8822	.8207
9	.8980+01	.1638+01	.5823+03	.0000	.5823+03	.4602+03	.0000	.1645+00	.5732+00	.8804	.8003
10	.9176+01	.1769+01	.6085+03	.0000	.6085+03	.4628+03	.0000	.1840+00	.6007+00	.8786	.7836
11	.9382+01	.1885+01	.6288+03	.0000	.6288+03	.4652+03	.0000	.2037+00	.6223+00	.8769	.7702
12	.9597+01	.1989+01	.6441+03	.0000	.6441+03	.4674+03	.0000	.2235+00	.6386+00	.8754	.7600
13	.9818+01	.2081+01	.6551+03	.0000	.6551+03	.4694+03	.0000	.2435+00	.6505+00	.8740	.7525
14	.1005+02	.2161+01	.6625+03	.0000	.6625+03	.4710+03	.0000	.2635+00	.6585+00	.8728	.7475
15	.1028+02	.2230+01	.6666+03	.0000	.6666+03	.4724+03	.0000	.2837+00	.6629+00	.8716	.7446
16	.1052+02	.2286+01	.6677+03	.0000	.6677+03	.4735+03	.0000	.3039+00	.6641+00	.8710	.7439
17	.1075+02	.2331+01	.6658+03	.0000	.6658+03	.4743+03	.0000	.3242+00	.6620+00	.8704	.7452
18	.1100+02	.2365+01	.6605+03	.0000	.6605+03	.4745+03	.0000	.3446+00	.6563+00	.8700	.7488
19	.1124+02	.2387+01	.6510+03	.0000	.6510+03	.4753+03	.0000	.3650+00	.6460+00	.8698	.7553
20	.1149+02	.2399+01	.6313+03	.0000	.6313+03	.4754+03	.0000	.3854+00	.6249+00	.8696	.7686
21	.1174+02	.2400+01	.6044+03	.0000	.6044+03	.4755+03	.0000	.4062+00	.5964+00	.8696	.7662
22	.1202+02	.2400+01	.5840+03	.0000	.5840+03	.4755+03	.0000	.4296+00	.5749+00	.8696	.7993
23	.1236+02	.2400+01	.5722+03	.0000	.5722+03	.4755+03	.0000	.4575+00	.5625+00	.8696	.8067
24	.1276+02	.2400+01	.5636+03	.0000	.5636+03	.4755+03	.0000	.4911+00	.5536+00	.8696	.8121
25	.1324+02	.2400+01	.5573+03	.0000	.5573+03	.4755+03	.0000	.5314+00	.5470+00	.8696	.8159
26	.1393+02	.2400+01	.5529+03	.0000	.5529+03	.4755+03	.0000	.5798+00	.5424+00	.8696	.8186
27	.1452+02	.2400+01	.5500+03	.0000	.5500+03	.4755+03	.0000	.6378+00	.5394+00	.8696	.8204
28	.1536+02	.2400+01	.5482+03	.0000	.5482+03	.4755+03	.0000	.7075+00	.5376+00	.8696	.8214
29	.1632+02	.2400+01	.5474+03	.0000	.5474+03	.4755+03	.0000	.7874+00	.5367+00	.8696	.8220
30	.1733+02	.2400+01	.5470+03	.0000	.5470+03	.4755+03	.0000	.8713+00	.5363+00	.8696	.8222
31	.1834+02	.2400+01	.5469+03	.0000	.5469+03	.4755+03	.0000	.9552+00	.5362+00	.8696	.8223
32	.1935+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1039+01	.5361+00	.8696	.8223
33	.2036+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1123+01	.5361+00	.8696	.8223
34	.2137+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1207+01	.5361+00	.8696	.8223
35	.2238+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1291+01	.5361+00	.8696	.8223
36	.2339+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1375+01	.5361+00	.8696	.8223
37	.2440+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1458+01	.5361+00	.8696	.8223
38	.2541+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1542+01	.5361+00	.8696	.8223
39	.2641+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1626+01	.5361+00	.8696	.8223
40	.2742+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1710+01	.5361+00	.8696	.8223
41	.2843+02	.2400+01	.5468+03	.0000	.5468+03	.4755+03	.0000	.1794+01	.5361+00	.8696	.8223
42	.2944+02	.2400+01	.5469+03	.0000	.5469+03	.4755+03	.0000	.1878+01	.5362+00	.8696	.8223
43	.3045+02	.2400+01	.5471+03	.0000	.5471+03	.4755+03	.0000	.1962+01	.5364+00	.8696	.8221
44	.3146+02	.2400+01	.5476+03	.0000	.5476+03	.4755+03	.0000	.2046+01	.5370+00	.8696	.8218
45	.3247+02	.2400+01	.5489+03	.0000	.5489+03	.4755+03	.0000	.2129+01	.5383+00	.8696	.8211
46	.3348+02	.2400+01	.5519+03	.0000	.5519+03	.4755+03	.0000	.2213+01	.5414+00	.8696	.8193
47	.3449+02	.2400+01	.5585+03	.0000	.5585+03	.4755+03	.0000	.2297+01	.5483+00	.8696	.8152
48	.3550+02	.2400+01	.5726+03	.0000	.5726+03	.4755+03	.0000	.2381+01	.5630+00	.8696	.8065

SHROUD

ON-BODY POINTS

I	X	Y	VP	VTHETA	VRES	VBARI	BETA	S	K	RB/RT	PSOFTC
49	.3550+02	.6000+01	-.5126+03	.0000	.5126+03	.4755+03	.0000	.2987+01	.5008+00	.8696	.8426
50	.3449+02	.6000+01	-.5347+03	.0000	.5347+03	.4755+03	.0000	.2903+01	.5236+00	.8696	.8295
51	.3348+02	.6000+01	-.5426+03	.0000	.5426+03	.4755+03	.0000	.2819+01	.5317+00	.8696	.8249
52	.3247+02	.6000+01	-.5452+03	.0000	.5452+03	.4755+03	.0000	.2735+01	.5344+00	.8696	.8233

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53	.3146+02	.6003+01	-.5461+03	.0000	.5461+03	.4755+03	.0000	.2652+01	.5354+00	.8696	.8227
54	.3045+02	.6003+01	-.5465+03	.0000	.5465+03	.4755+03	.0000	.2566+01	.5358+00	.8696	.8225
55	.2944+02	.6003+01	-.5467+03	.0000	.5467+03	.4755+03	.0000	.2484+01	.5360+00	.8696	.8224
56	.2843+02	.6003+01	-.5467+03	.0000	.5467+03	.4755+03	.0000	.2400+01	.5360+00	.8696	.8224
57	.2742+02	.6003+01	-.5467+03	.0000	.5467+03	.4755+03	.0000	.2316+01	.5360+00	.8696	.8224
58	.2641+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.2232+01	.5361+00	.8696	.8224
59	.2541+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.2148+01	.5361+00	.8696	.8224
60	.2440+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.2064+01	.5361+00	.8696	.8224
61	.2339+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.1981+01	.5361+00	.8696	.8224
62	.2238+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.1897+01	.5361+00	.8696	.8224
63	.2137+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.1813+01	.5361+00	.8696	.8224
64	.2036+02	.6003+01	-.5468+03	.0000	.5468+03	.4755+03	.0000	.1729+01	.5361+00	.8696	.8224
65	.1935+02	.6003+01	-.5467+03	.0000	.5467+03	.4755+03	.0000	.1645+01	.5360+00	.8696	.8224
66	.1834+02	.6003+01	-.5467+03	.0000	.5467+03	.4755+03	.0000	.1561+01	.5360+00	.8696	.8224
67	.1733+02	.6003+01	-.5466+03	.0000	.5466+03	.4755+03	.0000	.1477+01	.5359+00	.8696	.8224
68	.1632+02	.6003+01	-.5463+03	.0000	.5463+03	.4755+03	.0000	.1393+01	.5356+00	.8696	.8226
69	.1536+02	.6003+01	-.5458+03	.0000	.5458+03	.4755+03	.0000	.1314+01	.5350+00	.8696	.8229
70	.1452+02	.6003+01	-.5447+03	.0000	.5447+03	.4755+03	.0000	.1244+01	.5339+00	.8696	.8236
71	.1383+02	.6003+01	-.5429+03	.0000	.5429+03	.4755+03	.0000	.1186+01	.5321+00	.8696	.8247
72	.1324+02	.6003+01	-.5404+03	.0000	.5404+03	.4755+03	.0000	.1137+01	.5295+00	.8696	.8262
73	.1276+02	.6003+01	-.5370+03	.0000	.5370+03	.4755+03	.0000	.1097+01	.5259+00	.8696	.8282
74	.1236+02	.6003+01	-.5327+03	.0000	.5327+03	.4755+03	.0000	.1064+01	.5215+00	.8696	.8308
75	.1202+02	.6003+01	-.5275+03	.0000	.5275+03	.4755+03	.0000	.1036+01	.5162+00	.8696	.8339
76	.1174+02	.6003+01	-.5201+03	.0000	.5201+03	.4755+03	.0000	.1012+01	.5085+00	.8696	.8382
77	.1148+02	.5999+01	-.5115+03	.0000	.5115+03	.4754+03	.0000	.9912+00	.4997+00	.8696	.8432
78	.1123+02	.5995+01	-.5057+03	.0000	.5057+03	.4753+03	.0000	.9703+00	.4937+00	.8696	.8465
79	.1098+02	.5989+01	-.5033+03	.0000	.5033+03	.4749+03	.0000	.9495+00	.4913+00	.8700	.8479
80	.1074+02	.5979+01	-.5022+03	.0000	.5022+03	.4743+03	.0000	.9289+00	.4902+00	.8705	.8486
81	.1049+02	.5964+01	-.5021+03	.0000	.5021+03	.4734+01	.0000	.9086+00	.4901+00	.8711	.8486
82	.1024+02	.5948+01	-.5026+03	.0000	.5026+03	.4722+03	.0000	.8879+00	.4906+00	.8720	.8483
83	.9999+01	.5929+01	-.5037+03	.0000	.5037+03	.4707+03	.0000	.8675+00	.4917+00	.8731	.8477
84	.9756+01	.5937+01	-.5052+03	.0000	.5052+03	.4689+03	.0000	.8472+00	.4932+00	.8744	.8466
85	.9514+01	.5884+01	-.5070+03	.0000	.5070+03	.4665+03	.0000	.8274+00	.4951+00	.8760	.8456
86	.9272+01	.5859+01	-.5092+03	.0000	.5092+03	.4640+03	.0000	.8086+00	.4973+00	.8774	.8445
87	.9032+01	.5831+01	-.5116+03	.0000	.5116+03	.4605+03	.0000	.7887+00	.4996+00	.8799	.8431
88	.8792+01	.5802+01	-.5143+03	.0000	.5143+03	.4574+03	.0000	.7686+00	.5026+00	.8823	.8416
89	.8552+01	.5771+01	-.5172+03	.0000	.5172+03	.4535+03	.0000	.7485+00	.5056+00	.8849	.8399
90	.8313+01	.5739+01	-.5205+03	.0000	.5205+03	.4491+03	.0000	.7285+00	.5089+00	.8877	.8380
91	.8074+01	.5705+01	-.5240+03	.0000	.5240+03	.4442+03	.0000	.7084+00	.5125+00	.8908	.8359
92	.7836+01	.5673+01	-.5297+03	.0000	.5297+03	.4466+03	.0000	.6884+00	.5184+00	.8891	.8326
93	.7598+01	.5638+01	-.5366+03	.0000	.5366+03	.4423+03	.0000	.6685+00	.5255+00	.8856	.8285
94	.7361+01	.5603+01	-.5441+03	.0000	.5441+03	.4381+03	.0000	.6485+00	.5333+00	.8818	.8240
95	.7123+01	.5567+01	-.5523+03	.0000	.5523+03	.4342+03	.0000	.6285+00	.5418+00	.8778	.8190
96	.6885+01	.5531+01	-.5611+03	.0000	.5611+03	.4300+03	.0000	.6085+00	.5509+00	.8736	.8136
97	.6648+01	.5495+01	-.5705+03	.0000	.5705+03	.4267+03	.0000	.5885+00	.5608+00	.8690	.8077
98	.6410+01	.5455+01	-.5807+03	.0000	.5807+03	.4226+03	.0000	.5685+00	.5715+00	.8642	.8014
99	.6172+01	.5422+01	-.5916+03	.0000	.5916+03	.4189+03	.0000	.5486+00	.5829+00	.8592	.7948
100	.5935+01	.5385+01	-.6032+03	.0000	.6032+03	.4156+03	.0000	.5286+00	.5951+00	.8539	.7870
101	.5697+01	.5351+01	-.6154+03	.0000	.6154+03	.4121+03	.0000	.5086+00	.6081+00	.8483	.7790
102	.5459+01	.5317+01	-.6284+03	.0000	.6284+03	.4087+03	.0000	.4886+00	.6219+00	.8424	.7705
103	.5221+01	.5283+01	-.6421+03	.0000	.6421+03	.4055+03	.0000	.4687+00	.6365+00	.8364	.7614
104	.4983+01	.5250+01	-.6563+03	.0000	.6563+03	.4027+03	.0000	.4487+00	.6518+00	.8300	.7517
105	.4744+01	.5218+01	-.6712+03	.0000	.6712+03	.4000+03	.0000	.4287+00	.6679+00	.8235	.7415
106	.4505+01	.5189+01	-.6867+03	.0000	.6867+03	.3974+03	.0000	.4086+00	.6847+00	.8168	.7307
107	.4266+01	.5159+01	-.7027+03	.0000	.7027+03	.3948+03	.0000	.3886+00	.7022+00	.8099	.7190
108	.4026+01	.5132+01	-.7191+03	.0000	.7191+03	.3920+03	.0000	.3685+00	.7203+00	.8029	.7070
109	.3785+01	.5106+01	-.7359+03	.0000	.7359+03	.3891+03	.0000	.3484+00	.7388+00	.7959	.6950

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110	.3543+01	.5093+01	-.7527+03	.0000	.7527+03	.5565+03	.0000	.3202+00	.7578+00	.7890	.6835
111	.3301+01	.5062+01	-.7698+03	.0000	.7698+03	.5612+03	.0000	.5060+00	.7770+00	.7822	.6710
112	.3058+01	.5043+01	-.7867+03	.0000	.7867+03	.5654+03	.0000	.2807+00	.7802+00	.7758	.6580
113	.2813+01	.5025+01	-.8036+03	.0000	.8036+03	.5691+03	.0000	.2563+00	.7805+00	.7698	.6450
114	.2568+01	.5013+01	-.8203+03	.0000	.8203+03	.5721+03	.0000	.2349+00	.7809+00	.7646	.6336
115	.2321+01	.5002+01	-.8372+03	.0000	.8372+03	.5745+03	.0000	.2144+00	.7815+00	.7603	.6206
116	.2073+01	.4995+01	-.8556+03	.0000	.8556+03	.5762+03	.0000	.1957+00	.7821+00	.7572	.6060
117	.1823+01	.4991+01	-.8864+03	.0000	.8864+03	.5771+03	.0000	.1780+00	.7828+00	.7559	.5831
118	.1612+01	.4992+01	-.9229+03	.0000	.9229+03	.5767+03	.0000	.1624+00	.7831+00	.7560	.5550
119	.1445+01	.5000+01	-.9362+03	.0000	.9362+03	.5750+03	.0000	.1476+00	.7835+00	.7595	.5447
120	.1287+01	.5015+01	-.9264+03	.0000	.9264+03	.5714+03	.0000	.1333+00	.7835+00	.7589	.5322
121	.1137+01	.5039+01	-.9047+03	.0000	.9047+03	.5653+03	.0000	.1257+00	.7839+00	.7593	.5190
122	.0958+00	.5067+01	-.8742+03	.0000	.8742+03	.5500+03	.0000	.1137+00	.7842+00	.7540	.5024
123	.0630+00	.5101+01	-.8367+03	.0000	.8367+03	.5326+03	.0000	.1023+00	.7840+00	.7543	.4809
124	.0385+00	.5143+01	-.7931+03	.0000	.7931+03	.5143+03	.0000	.0915+00	.7835+00	.7500	.4553
125	.0222+00	.5183+01	-.7433+03	.0000	.7433+03	.5035+03	.0000	.0818+00	.7822+00	.7457	.4300
126	.0142+00	.5231+01	-.6867+03	.0000	.6867+03	.5254+03	.0000	.0713+00	.7800+00	.7202	.4007
127	.0054+00	.5284+01	-.6229+03	.0000	.6229+03	.5150+03	.0000	.0605+00	.7760+00	.7165	.3741
128	.0022+00	.5343+01	-.5506+03	.0000	.5506+03	.5043+03	.0000	.0529+00	.7700+00	.7104	.3480
129	.0063+00	.5400+01	-.4674+03	.0000	.4674+03	.4931+03	.0000	.0448+00	.7648+00	.7059	.3270
130	.0161+00	.5463+01	-.3713+03	.0000	.3713+03	.4817+03	.0000	.0370+00	.7585+00	.7000	.3020
131	.0177+00	.5529+01	-.2629+03	.0000	.2629+03	.4703+03	.0000	.0297+00	.7523+00	.6934	.2767
132	.0108+01	.5597+01	-.1424+03	.0000	.1424+03	.4590+03	.0000	.0229+00	.7460+00	.6812	.2522
133	.0056+01	.5667+01	-.8205+01	.0000	.8205+01	.4477+03	.0000	.0164+00	.7393+00	.6706	.2280
134	.0021+01	.5738+01	.1525+03	.0000	.1525+03	.5714+03	.0000	.0101+00	.7327+00	.6558	.2040
135	.0035+02	.5807+01	.3573+03	.0000	.3573+03	.5714+03	.0000	.0038+02	.7264+00	.6408	.1800
136	.0070+02	.5874+01	.6523+03	.0000	.6523+03	.5714+03	.0000	.0071+02	.7200+00	.6266	.1560
137	.0126+01	.5937+01	.9582+03	.0000	.9582+03	.5714+03	.0000	.0123+01	.7135+00	.6123	.1320
138	.0209+01	.5988+01	.1097+04	.0000	.1097+04	.5714+03	.0000	.0209+01	.7069+00	.6000	.1080
139	.0327+01	.6027+01	.1126+04	.0000	.1126+04	.5714+03	.0000	.0327+01	.7000+00	.5858	.0840
140	.0492+00	.6061+01	.1123+04	.0000	.1123+04	.5714+03	.0000	.0492+00	.6929+00	.5700	.0600
141	.0703+00	.6092+01	.1109+04	.0000	.1109+04	.5714+03	.0000	.0703+00	.6858+00	.5558	.0360
142	.1066+00	.6122+01	.1091+04	.0000	.1091+04	.5714+03	.0000	.1066+00	.6787+00	.5408	.0120
143	.1582+00	.6151+01	.1073+04	.0000	.1073+04	.5714+03	.0000	.1582+00	.6716+00	.5258	.0000
144	.2369+00	.6179+01	.1055+04	.0000	.1055+04	.5714+03	.0000	.2369+00	.6645+00	.5108	.0000
145	.3546+00	.6205+01	.1038+04	.0000	.1038+04	.5714+03	.0000	.3546+00	.6574+00	.4958	.0000
146	.5183+00	.6231+01	.1023+04	.0000	.1023+04	.5714+03	.0000	.5183+00	.6503+00	.4808	.0000
147	.7368+00	.6255+01	.1009+04	.0000	.1009+04	.5714+03	.0000	.7368+00	.6432+00	.4658	.0000
148	.1027+01	.6280+01	.9960+03	.0000	.9960+03	.5714+03	.0000	.1027+01	.6361+00	.4508	.0000
149	.0024+00	.6303+01	.9843+03	.0000	.9843+03	.5714+03	.0000	.0024+00	.6290+00	.4358	.0000
150	.0027+01	.6325+01	.9735+03	.0000	.9735+03	.5714+03	.0000	.0027+01	.6219+00	.4208	.0000
151	.0162+01	.6347+01	.9635+03	.0000	.9635+03	.5714+03	.0000	.0162+01	.6148+00	.4058	.0000
152	.0308+01	.6367+01	.9542+03	.0000	.9542+03	.5714+03	.0000	.0308+01	.6077+00	.3908	.0000
153	.0465+01	.6385+01	.9454+03	.0000	.9454+03	.5714+03	.0000	.0465+01	.6006+00	.3758	.0000
154	.0635+01	.6404+01	.9371+03	.0000	.9371+03	.5714+03	.0000	.0635+01	.5935+00	.3608	.0000
155	.0818+01	.6420+01	.9289+03	.0000	.9289+03	.5714+03	.0000	.0818+01	.5864+00	.3458	.0000
156	.1016+01	.6434+01	.9207+03	.0000	.9207+03	.5714+03	.0000	.1016+01	.5793+00	.3308	.0000
157	.1230+01	.6445+01	.9118+03	.0000	.9118+03	.5714+03	.0000	.1230+01	.5722+00	.3158	.0000
158	.1461+01	.6452+01	.8958+03	.0000	.8958+03	.5714+03	.0000	.1461+01	.5651+00	.3008	.0000
159	.1710+01	.6453+01	.8678+03	.0000	.8678+03	.5714+03	.0000	.1710+01	.5580+00	.2858	.0000
160	.1969+01	.6453+01	.8443+03	.0000	.8443+03	.5714+03	.0000	.1969+01	.5509+00	.2708	.0000
161	.2226+01	.6453+01	.8314+03	.0000	.8314+03	.5714+03	.0000	.2226+01	.5438+00	.2558	.0000
162	.2484+01	.6453+01	.8218+03	.0000	.8218+03	.5714+03	.0000	.2484+01	.5367+00	.2408	.0000
163	.2742+01	.6453+01	.8142+03	.0000	.8142+03	.5714+03	.0000	.2742+01	.5296+00	.2258	.0000
164	.3000+01	.6453+01	.8080+03	.0000	.8080+03	.5714+03	.0000	.3000+01	.5225+00	.2108	.0000
165	.3258+01	.6453+01	.8029+03	.0000	.8029+03	.5714+03	.0000	.3258+01	.5154+00	.1958	.0000
166	.3516+01	.6453+01	.7985+03	.0000	.7985+03	.5714+03	.0000	.3516+01	.5083+00	.1808	.0000

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167	.4774+01	.6453+01	.7947+03	.0000	.7947+03	.5714+03	.0000	-.4102+00	.8053+00	.7656	.6526
168	.5032+01	.6453+01	.7913+03	.0000	.7913+03	.5714+03	.0000	-.4316+00	.8015+00	.7658	.6551
169	.5290+01	.6453+01	.7884+03	.0000	.7884+03	.5714+03	.0000	-.4531+00	.7981+00	.7658	.6572
170	.5548+01	.6453+01	.7850+03	.0000	.7850+03	.5714+03	.0000	-.4745+00	.7952+00	.7658	.6592
171	.5805+01	.6453+01	.7835+03	.0000	.7835+03	.5714+03	.0000	-.4959+00	.7925+00	.7658	.6609
172	.6064+01	.6453+01	.7814+03	.0000	.7814+03	.5714+03	.0000	-.5174+00	.7902+00	.7658	.6624
173	.6322+01	.6453+01	.7795+03	.0000	.7795+03	.5714+03	.0000	-.5386+00	.7880+00	.7658	.6638
174	.6580+01	.6453+01	.7778+03	.0000	.7778+03	.5714+03	.0000	-.5603+00	.7861+00	.7658	.6651
175	.6838+01	.6453+01	.7763+03	.0000	.7763+03	.5714+03	.0000	-.5817+00	.7843+00	.7658	.6662
176	.7095+01	.6453+01	.7748+03	.0000	.7748+03	.5714+03	.0000	-.6032+00	.7827+00	.7658	.6673
177	.7354+01	.6453+01	.7735+03	.0000	.7735+03	.5714+03	.0000	-.6246+00	.7812+00	.7658	.6683
178	.7612+01	.6453+01	.7723+03	.0000	.7723+03	.5714+03	.0000	-.6461+00	.7798+00	.7658	.6691
179	.7870+01	.6453+01	.7712+03	.0000	.7712+03	.5714+03	.0000	-.6675+00	.7786+00	.7658	.6700
180	.8128+01	.6453+01	.7702+03	.0000	.7702+03	.5714+03	.0000	-.6890+00	.7774+00	.7658	.6707
181	.8385+01	.6453+01	.7692+03	.0000	.7692+03	.5714+03	.0000	-.7104+00	.7763+00	.7658	.6714
182	.8644+01	.6453+01	.7683+03	.0000	.7683+03	.5714+03	.0000	-.7319+00	.7753+00	.7658	.6721
183	.8902+01	.6453+01	.7675+03	.0000	.7675+03	.5714+03	.0000	-.7533+00	.7744+00	.7658	.6727
184	.9160+01	.6453+01	.7667+03	.0000	.7667+03	.5714+03	.0000	-.7747+00	.7735+00	.7658	.6733
185	.9418+01	.6453+01	.7660+03	.0000	.7660+03	.5714+03	.0000	-.7962+00	.7727+00	.7658	.6738
186	.9676+01	.6453+01	.7653+03	.0000	.7653+03	.5714+03	.0000	-.8176+00	.7719+00	.7658	.6743
187	.9934+01	.6453+01	.7647+03	.0000	.7647+03	.5714+03	.0000	-.8391+00	.7712+00	.7658	.6748
188	.1019+02	.6453+01	.7641+03	.0000	.7641+03	.5714+03	.0000	-.8605+00	.7705+00	.7658	.6752
189	.1045+02	.6453+01	.7635+03	.0000	.7635+03	.5714+03	.0000	-.8820+00	.7699+00	.7658	.6756
190	.1071+02	.6453+01	.7630+03	.0000	.7630+03	.5714+03	.0000	-.9034+00	.7693+00	.7658	.6760
191	.1097+02	.6453+01	.7625+03	.0000	.7625+03	.5714+03	.0000	-.9249+00	.7687+00	.7658	.6764
192	.1122+02	.6453+01	.7620+03	.0000	.7620+03	.5714+03	.0000	-.9463+00	.7682+00	.7658	.6768
193	.1148+02	.6453+01	.7615+03	.0000	.7615+03	.5714+03	.0000	-.9678+00	.7674+00	.7658	.6771
194	.1174+02	.6453+01	.7611+03	.0000	.7611+03	.5714+03	.0000	-.9892+00	.7672+00	.7658	.6774
195	.1202+02	.6453+01	.7608+03	.0000	.7608+03	.5714+03	.0000	-.1013+01	.7668+00	.7658	.6777
196	.1236+02	.6453+01	.7603+03	.0000	.7603+03	.5714+03	.0000	-.1041+01	.7662+00	.7658	.6780
197	.1277+02	.6453+01	.7597+03	.0000	.7597+03	.5714+03	.0000	-.1075+01	.7656+00	.7658	.6784
198	.1326+02	.6453+01	.7591+03	.0000	.7591+03	.5714+03	.0000	-.1116+01	.7650+00	.7658	.6788
199	.1385+02	.6453+01	.7585+03	.0000	.7585+03	.5714+03	.0000	-.1165+01	.7642+00	.7658	.6793
200	.1456+02	.6453+01	.7578+03	.0000	.7578+03	.5714+03	.0000	-.1223+01	.7635+00	.7658	.6798
201	.1541+02	.6453+01	.7571+03	.0000	.7571+03	.5714+03	.0000	-.1294+01	.7627+00	.7658	.6803
202	.1637+02	.6453+01	.7565+03	.0000	.7565+03	.5714+03	.0000	-.1374+01	.7619+00	.7658	.6808
203	.1738+02	.6453+01	.7559+03	.0000	.7559+03	.5714+03	.0000	-.1458+01	.7613+00	.7658	.6812
204	.1838+02	.6453+01	.7555+03	.0000	.7555+03	.5714+03	.0000	-.1542+01	.7608+00	.7658	.6815
205	.1939+02	.6453+01	.7551+03	.0000	.7551+03	.5714+03	.0000	-.1625+01	.7604+00	.7658	.6818
206	.2040+02	.6453+01	.7549+03	.0000	.7549+03	.5714+03	.0000	-.1709+01	.7602+00	.7658	.6820
207	.2140+02	.6453+01	.7547+03	.0000	.7547+03	.5714+03	.0000	-.1793+01	.7600+00	.7658	.6821
208	.2241+02	.6453+01	.7547+03	.0000	.7547+03	.5714+03	.0000	-.1876+01	.7600+00	.7658	.6821
209	.2342+02	.6453+01	.7547+03	.0000	.7547+03	.5714+03	.0000	-.1960+01	.7600+00	.7658	.6821
210	.2442+02	.6453+01	.7549+03	.0000	.7549+03	.5714+03	.0000	-.2044+01	.7602+00	.7658	.6819
211	.2543+02	.6453+01	.7552+03	.0000	.7552+03	.5714+03	.0000	-.2127+01	.7605+00	.7658	.6817
212	.2644+02	.6453+01	.7556+03	.0000	.7556+03	.5714+03	.0000	-.2211+01	.7610+00	.7658	.6814
213	.2744+02	.6453+01	.7562+03	.0000	.7562+03	.5714+03	.0000	-.2295+01	.7617+00	.7658	.6810
214	.2845+02	.6453+01	.7571+03	.0000	.7571+03	.5714+03	.0000	-.2378+01	.7626+00	.7658	.6804
215	.2946+02	.6453+01	.7582+03	.0000	.7582+03	.5714+03	.0000	-.2462+01	.7640+00	.7658	.6795
216	.3046+02	.6453+01	.7599+03	.0000	.7599+03	.5714+03	.0000	-.2546+01	.7659+00	.7658	.6783
217	.3147+02	.6453+01	.7624+03	.0000	.7624+03	.5714+03	.0000	-.2629+01	.7686+00	.7658	.6765
218	.3248+02	.6453+01	.7662+03	.0000	.7662+03	.5714+03	.0000	-.2713+01	.7729+00	.7658	.6737
219	.3348+02	.6453+01	.7728+03	.0000	.7728+03	.5714+03	.0000	-.2797+01	.7804+00	.7658	.6688
220	.3449+02	.6453+01	.7867+03	.0000	.7867+03	.5714+03	.0000	-.2880+01	.7962+00	.7658	.6595
221	.3550+02	.6453+01	.8209+03	.0000	.8209+03	.5714+03	.0000	-.2964+01	.8355+00	.7658	.6329

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OFF-BODY POINTS (TRACES)

COORDINATES				VELOCITIES				PRESS. RATIO			
AXIAL	RADIAL	AXIAL	RADIAL	CIRCUMFRNTL	RESULTANT	MERIDIONAL	CHORDWISE	SPANWISE	COMP	RHOBR	PSOPTC
I	X	VX	VY	VZ	VRES	VH	VHFT	VSPAN			
1	-5.0000-01	0.0000	5.9163+02	0.0000	0.0000	5.9163+02	0.0000	0.0000	0.0000	.9014	.7944
2	-5.0000-01	0.0000	5.9163+02	5.1903-07	0.0000	5.9163+02	5.1903-07	0.0000	0.0000	.9014	.7944
3	-5.0000-01	7.2222-01	5.9108+02	-2.6467+00	0.0000	5.9108+02	5.9108+02	-2.6467+00	0.0000	.9014	.7948
4	-5.0000-01	1.4444+00	5.8918+02	-5.7862+00	0.0000	5.8921+02	5.8921+02	-5.7862+00	0.0000	.9014	.7960
5	-5.0000-01	2.1657+00	5.8512+02	-9.9601+00	0.0000	5.8521+02	5.8521+02	-9.9601+00	0.0000	.9014	.7985
6	-5.0000-01	2.8839+00	5.7700+02	-1.5744+01	0.0000	5.7721+02	5.7721+02	-1.5744+01	0.0000	.9014	.8036
7	-5.0000-01	3.6111+00	5.6035+02	-2.3313+01	0.0000	5.6084+02	5.6084+02	-2.3313+01	0.0000	.9014	.8138
8	-5.0000-01	4.3333+00	5.2445+02	-2.9416+01	0.0000	5.2527+02	5.2527+02	-2.9416+01	0.0000	.9014	.8352
9	-5.0000-01	5.0556+00	4.4885+02	-8.4441+00	0.0000	4.4893+02	4.4893+02	-8.4441+00	0.0000	.9014	.8775
10	-5.0000-01	5.7778+00	4.1327+02	-1.3327+02	0.0000	4.3422+02	4.3422+02	-1.3327+02	0.0000	.9014	.8851
11	-5.0000-01	6.5000+00	5.7650+02	1.7265+02	0.0000	6.0179+02	6.0179+02	1.7265+02	0.0000	.9014	.8879
12	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		.8000
13	0.0000	0.0000	5.9607+02	0.0000	0.0000	5.9607+02	0.0000	0.0000	0.0000		.7916
14	0.0000	0.0000	5.9607+02	4.7963-07	0.0000	5.9607+02	4.7963-07	0.0000	0.0000	.9014	.7916
15	0.0000	5.1111-01	5.9590+02	-2.6549+00	0.0000	5.9591+02	5.9591+02	-2.6549+00	0.0000	.9014	.7917
16	0.0000	1.2222+00	5.9531+02	-5.7610+00	0.0000	5.9534+02	5.9534+02	-5.7610+00	0.0000	.9014	.7921
17	0.0000	1.8333+00	5.9401+02	-9.8581+00	0.0000	5.9409+02	5.9409+02	-9.8581+00	0.0000	.9014	.7929
18	0.0000	2.4444+00	5.9137+02	-1.5707+01	0.0000	5.9158+02	5.9158+02	-1.5707+01	0.0000	.9014	.7945
19	0.0000	3.0556+00	5.8600+02	-2.4525+01	0.0000	5.8652+02	5.8652+02	-2.4525+01	0.0000	.9014	.7977
20	0.0000	3.6667+00	5.7466+02	-3.8451+01	0.0000	5.7595+02	5.7595+02	-3.8451+01	0.0000	.9014	.8044
21	0.0000	4.2778+00	5.4835+02	-6.1306+01	0.0000	5.5176+02	5.5176+02	-6.1306+01	0.0000	.9014	.8193
22	0.0000	4.8889+00	4.7610+02	-9.7428+01	0.0000	4.8596+02	4.8596+02	-9.7428+01	0.0000	.9014	.8576
23	0.0000	5.5000+00	2.0765+02	-8.7131+01	0.0000	2.2519+02	2.2519+02	-8.7131+01	0.0000	.9014	.9681
24	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		.0000
25	0.0000-01	0.0000	6.3941+02	0.0000	0.0000	6.3941+02	0.0000	0.0000	0.0000		.7631
26	5.0000-01	0.0000	6.3941+02	4.5479-07	0.0000	6.3941+02	4.5479-07	0.0000	0.0000	.8277	.7631
27	5.0000-01	5.6922-01	6.3954+02	-2.6647+00	0.0000	6.3955+02	6.3955+02	-2.6647+00	0.0000	.8277	.7630
28	5.0000-01	1.1384+00	6.3990+02	-5.7895+00	0.0000	6.3992+02	6.3992+02	-5.7895+00	0.0000	.8277	.7628
29	5.0000-01	1.7076+00	6.4041+02	-9.9269+00	0.0000	6.4049+02	6.4049+02	-9.9269+00	0.0000	.8277	.7624
30	5.0000-01	2.2769+00	6.4095+02	-1.5865+01	0.0000	6.4114+02	6.4114+02	-1.5865+01	0.0000	.8277	.7620
31	5.0000-01	2.8451+00	6.4124+02	-2.4906+01	0.0000	6.4172+02	6.4172+02	-2.4906+01	0.0000	.8277	.7616
32	5.0000-01	3.4153+00	6.4076+02	-3.9538+01	0.0000	6.4198+02	6.4198+02	-3.9538+01	0.0000	.8277	.7614
33	5.0000-01	3.9845+00	6.3832+02	-5.5299+01	0.0000	6.4166+02	6.4166+02	-5.5299+01	0.0000	.8277	.7616
34	5.0000-01	4.5537+00	6.3064+02	-1.1717+02	0.0000	6.4143+02	6.4143+02	-1.1717+02	0.0000	.8277	.7618
35	5.0000-01	5.1229+00	6.1097+02	-2.4960+02	0.0000	6.5999+02	6.5999+02	-2.4960+02	0.0000	.8277	.7492
36	5.0000-01	5.2332+00	6.0886+02	-2.6971+02	0.0000	6.7863+02	6.7863+02	-2.6971+02	0.0000		.7364
37	1.0000+00	0.0000	6.7044+02	0.0000	0.0000	6.7044+02	0.0000	0.0000	0.0000		.7420
38	1.0000+00	0.0000	6.7044+02	4.3410-07	0.0000	6.7044+02	4.3410-07	0.0000	0.0000	.7837	.7420
39	1.0000+00	5.4730-01	6.7087+02	-2.2465+00	0.0000	6.7088+02	6.7088+02	-2.2465+00	0.0000	.7837	.7417
40	1.0000+00	1.0946+00	6.7221+02	-4.9127+00	0.0000	6.7223+02	6.7223+02	-4.9127+00	0.0000	.7837	.7408
41	1.0000+00	1.6419+00	6.7455+02	-8.4890+00	0.0000	6.7461+02	6.7461+02	-8.4890+00	0.0000	.7837	.7391
42	1.0000+00	2.1892+00	6.7814+02	-1.3641+01	0.0000	6.7828+02	6.7828+02	-1.3641+01	0.0000	.7837	.7366
43	1.0000+00	2.7365+00	6.8349+02	-2.1398+01	0.0000	6.8382+02	6.8382+02	-2.1398+01	0.0000	.7837	.7327
44	1.0000+00	3.2838+00	6.9183+02	-3.3550+01	0.0000	6.9265+02	6.9265+02	-3.3550+01	0.0000	.7837	.7266
45	1.0000+00	3.8311+00	7.0635+02	-5.3616+01	0.0000	7.0839+02	7.0839+02	-5.3616+01	0.0000	.7837	.7155
46	1.0000+00	4.3784+00	7.3657+02	-8.9575+01	0.0000	7.4260+02	7.4260+02	-8.9575+01	0.0000	.7837	.6913
47	1.0000+00	4.9257+00	8.1541+02	-1.6262+02	0.0000	8.3147+02	8.3147+02	-1.6262+02	0.0000	.7837	.6249
48	1.0000+00	5.0650+00	8.5360+02	-1.9339+02	0.0000	8.7524+02	8.7524+02	-1.9339+02	0.0000		.5916
49	1.5000+00	0.0000	6.9123+02	0.0000	0.0000	6.9123+02	0.0000	0.0000	0.0000		.7276
50	1.5000+00	0.0000	6.9123+02	3.9383-07	0.0000	6.9123+02	3.9383-07	0.0000	0.0000	.7580	.7276
51	1.5000+00	5.3737-01	6.9196+02	-1.3861+00	0.0000	6.9196+02	6.9196+02	-1.3861+00	0.0000	.7580	.7271
52	1.5000+00	1.0741+00	6.9419+02	-3.1095+00	0.0000	6.9420+02	6.9420+02	-3.1095+00	0.0000	.7580	.7255

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44	1.5000+00	1.6112+00	6.9816+02	-5.5414+00	0.0000	6.9818+02	6.9818+02	-5.5414+00	0.0000	.7580	.7227
45	1.5000+00	2.1493+00	7.0430+02	-9.1318+00	0.0000	7.0436+02	7.0436+02	-9.1318+00	0.0000	.7580	.7183
46	1.5000+00	2.6854+00	7.1356+02	-1.4463+01	0.0000	7.1370+02	7.1370+02	-1.4463+01	0.0000	.7580	.7117
47	1.5000+00	3.2224+00	7.2781+02	-2.2294+01	0.0000	7.2815+02	7.2815+02	-2.2294+01	0.0000	.7580	.7013
48	1.5000+00	3.7595+00	7.5118+02	-3.3448+01	0.0000	7.5193+02	7.5193+02	-3.3448+01	0.0000	.7580	.6841
49	1.5000+00	4.2956+00	7.9353+02	-4.7697+01	0.0000	7.9496+02	7.9496+02	-4.7697+01	0.0000	.7580	.6524
50	1.5000+00	4.8336+00	8.8304+02	-5.6916+01	0.0000	8.8488+02	8.8488+02	-5.6916+01	0.0000	.7580	.5842
	1.5000+00	4.9958+00	9.3293+02	-5.3603+01	0.0000	9.3447+02	9.3447+02	-5.3603+01	0.0000		.5460
	1.6980+00	0.0000	6.9397+02	0.0000	0.0000	6.9397+02	0.0000	0.0000	0.0000		.7256
51	1.6980+00	0.0000	6.9397+02	3.7478-07	0.0000	6.9397+02	6.9397+02	3.7478-07	0.0000	.7556	.7256
52	1.6980+00	5.3550-01	6.9479+02	-9.2902-01	0.0000	6.9479+02	6.9479+02	-9.2902-01	0.0000	.7556	.7251
53	1.6980+00	1.0710+00	6.9732+02	-2.1543+00	0.0000	6.9732+02	6.9732+02	-2.1543+00	0.0000	.7556	.7233
54	1.6980+00	1.6065+00	7.0179+02	-3.9899+00	0.0000	7.0180+02	7.0180+02	-3.9899+00	0.0000	.7556	.7201
55	1.6980+00	2.1420+00	7.0870+02	-6.7886+00	0.0000	7.0873+02	7.0873+02	-6.7886+00	0.0000	.7556	.7152
56	1.6980+00	2.6775+00	7.1901+02	-1.0947+01	0.0000	7.1910+02	7.1910+02	-1.0947+01	0.0000	.7556	.7078
57	1.6980+00	3.2130+00	7.3460+02	-1.6839+01	0.0000	7.3479+02	7.3479+02	-1.6839+01	0.0000	.7556	.6966
58	1.6980+00	3.7485+00	7.5921+02	-2.4439+01	0.0000	7.5951+02	7.5951+02	-2.4439+01	0.0000	.7556	.6785
59	1.6980+00	4.2890+00	8.0059+02	-3.1515+01	0.0000	8.0121+02	8.0121+02	-3.1515+01	0.0000	.7556	.6477
60	1.6980+00	4.8195+00	8.7398+02	-2.3930+01	0.0000	8.7431+02	8.7431+02	-2.3930+01	0.0000	.7556	.5923
	1.6980+00	4.9907+00	9.1068+02	-9.1526+00	0.0000	9.1073+02	9.1073+02	-9.1526+00	0.0000		.5644
	2.6980+00	0.0000	6.8369+02	0.0000	0.0000	6.8369+02	0.0000	0.0000	0.0000		.7328
61	2.6980+00	0.0000	6.8369+02	2.7682-07	0.0000	6.8369+02	6.8369+02	2.7682-07	0.0000	.7673	.7328
62	2.6980+00	5.3049-01	6.8477+02	1.9994+00	0.0000	6.8478+02	6.8478+02	1.9994+00	0.0000	.7673	.7321
63	2.6980+00	1.0610+00	6.9021+02	3.9021+00	0.0000	6.9021+02	6.9021+02	3.9021+00	0.0000	.7673	.7298
64	2.6980+00	1.5915+00	6.9372+02	5.6557+00	0.0000	6.9374+02	6.9374+02	5.6557+00	0.0000	.7673	.7258
65	2.6980+00	2.1220+00	7.0201+02	7.3033+00	0.0000	7.0205+02	7.0205+02	7.3033+00	0.0000	.7673	.7199
66	2.6980+00	2.6524+00	7.1344+02	9.0890+00	0.0000	7.1349+02	7.1349+02	9.0890+00	0.0000	.7673	.7118
67	2.6980+00	3.1829+00	7.2865+02	1.1505+01	0.0000	7.2874+02	7.2874+02	1.1505+01	0.0000	.7673	.7009
68	2.6980+00	3.7134+00	7.4832+02	1.5726+01	0.0000	7.4849+02	7.4849+02	1.5726+01	0.0000	.7673	.6866
69	2.6980+00	4.2439+00	7.7238+02	2.3596+01	0.0000	7.7274+02	7.7274+02	2.3596+01	0.0000	.7673	.6688
70	2.6980+00	4.7744+00	7.9855+02	3.6943+01	0.0000	7.9940+02	7.9940+02	3.6943+01	0.0000	.7673	.6490
	2.6980+00	5.0197+00	8.1018+02	4.4862+01	0.0000	8.1143+02	8.1143+02	4.4862+01	0.0000		.6409
	3.6980+00	0.0000	6.5045+02	0.0000	0.0000	6.5045+02	0.0000	0.0000	0.0000		.7557
71	3.6980+00	0.0000	6.5045+02	1.9479-07	0.0000	6.5045+02	6.5045+02	1.9479-07	0.0000	.7934	.7557
72	3.6980+00	5.3948-01	6.5166+02	5.4007+00	0.0000	6.5166+02	6.5166+02	5.4007+00	0.0000	.7934	.7549
73	3.6980+00	1.0790+00	6.5518+02	1.0723+01	0.0000	6.5527+02	6.5527+02	1.0723+01	0.0000	.7934	.7524
74	3.6980+00	1.6184+00	6.6096+02	1.5971+01	0.0000	6.6116+02	6.6116+02	1.5971+01	0.0000	.7934	.7484
75	3.6980+00	2.1579+00	6.6806+02	2.1287+01	0.0000	6.6920+02	6.6920+02	2.1287+01	0.0000	.7934	.7429
76	3.6980+00	2.6974+00	6.7874+02	2.7001+01	0.0000	6.7928+02	6.7928+02	2.7001+01	0.0000	.7934	.7359
77	3.6980+00	3.2359+00	6.9043+02	3.3634+01	0.0000	6.9125+02	6.9125+02	3.3634+01	0.0000	.7934	.7276
78	3.6980+00	3.7763+00	7.0361+02	4.1858+01	0.0000	7.0486+02	7.0486+02	4.1858+01	0.0000	.7934	.7180
79	3.6980+00	4.3158+00	7.1774+02	5.2364+01	0.0000	7.1964+02	7.1964+02	5.2364+01	0.0000	.7934	.7074
80	3.6980+00	4.8553+00	7.3204+02	5.5651+01	0.0000	7.3497+02	7.3497+02	5.5651+01	0.0000	.7934	.6964
	3.6980+00	5.0976+00	7.3833+02	7.2639+01	0.0000	7.4190+02	7.4190+02	7.2639+01	0.0000		.6914
	1.1600+01	2.3992+00	6.7182+02	4.7135+00	0.0000	6.7182+02	6.7182+02	4.7135+00	0.0000		.7772
81	1.1600+01	2.6458+00	6.8030+02	2.1175+01	0.0000	6.8032+02	6.8032+02	2.1175+01	0.0000	.8696	.7869
82	1.1600+01	2.9935+00	6.8536+02	2.9186+01	0.0000	6.8509+02	6.8509+02	2.9186+01	0.0000	.8696	.7980
83	1.1600+01	3.3351+00	6.9167+02	3.1038+01	0.0000	6.9252+02	6.9252+02	3.1038+01	0.0000	.8696	.8065
84	1.1600+01	3.6798+00	6.9676+02	3.0279+01	0.0000	6.9758+02	6.9758+02	3.0279+01	0.0000	.8696	.8133
85	1.1600+01	4.0245+00	6.9519+02	2.8254+01	0.0000	6.9525+02	6.9525+02	2.8254+01	0.0000	.8696	.8189
86	1.1600+01	4.3691+00	6.9416+02	2.5519+01	0.0000	6.9475+02	6.9475+02	2.5519+01	0.0000	.8696	.8236
87	1.1600+01	4.7138+00	6.9374+02	2.2270+01	0.0000	6.9389+02	6.9389+02	2.2270+01	0.0000	.8696	.8277
88	1.1600+01	5.0585+00	6.9312+02	1.8485+01	0.0000	6.9316+02	6.9316+02	1.8485+01	0.0000	.8696	.8316
89	1.1600+01	5.4031+00	6.9254+02	1.3931+01	0.0000	6.9256+02	6.9256+02	1.3931+01	0.0000	.8696	.8349
90	1.1600+01	5.7478+00	6.9197+02	7.9568+00	0.0000	6.9198+02	6.9198+02	7.9568+00	0.0000	.8696	.8384
	1.1600+01	6.0930+00	6.9150+02	1.5657+00	0.0000	6.9150+02	6.9150+02	1.5657+00	0.0000		.8411

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I	COORDINATES		NEW CP	*--ANGLES--*						
	AXIAL	RAJIAL		MERIDIONAL	FLOW	UNDERTURNING	SPANWISE	SWIRL		
	X	Y	VBRI	H	ALPHA	BETA	ETA	ZETA	PHI	CFRACT
	-5.0000-01	0.0000		5.8293-01	5.0264-08	0.0000	0.0000	0.0000	0.0000	0.0000
1	-5.0000-01	0.0000	4.2634+02	5.8293-01	5.0264-08	0.0000	5.0264-08	0.0000	0.0000	0.0000
2	-5.0000-01	7.2222-01	4.2634+02	5.8235-01	-2.5655-01	0.0000	-2.5655-01	0.0000	0.0000	1.8213-02
3	-5.0000-01	1.4444+00	4.2634+02	5.8038-01	-5.6267-01	0.0000	-5.6267-01	0.0000	0.0000	7.2774-02
4	-5.0000-01	2.1657+00	4.2634+02	5.7618-01	-9.7521-01	0.0000	-9.7521-01	0.0000	0.0000	1.6339-01
5	-5.0000-01	2.6839+00	4.2634+02	5.6779-01	-1.5630+00	0.0000	-1.5630+00	0.0000	0.0000	2.8934-01
6	-5.0000-01	3.6111+00	4.2634+02	5.5069-01	-2.3823+00	0.0000	-2.3823+00	0.0000	0.0000	3.4382-01
7	-5.0000-01	4.3333+00	4.2634+02	5.1386-01	-3.2104+00	0.0000	-3.2104+00	0.0000	0.0000	6.3707-01
8	-5.0000-01	5.0556+00	4.2634+02	4.3608-01	-1.0778+00	0.0000	-1.0778+00	0.0000	0.0000	8.4143-01
9	-5.0000-01	5.7778+00	4.2634+02	4.2128-01	1.7874+01	0.0000	1.7874+01	0.0000	0.0000	1.0554+00
10	-5.0000-01	6.5000+00	4.2634+02	5.9364-01	1.6672+01	0.0000	1.6672+01	0.0000	0.0000	1.3243+00
	-5.0000-01	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3243+00
	0.0000	0.0000		5.8760-01	4.6103-08	0.0000	0.0000	0.0000	0.0000	0.0000
11	0.0000	0.0000	4.2634+02	5.8760-01	4.6103-08	0.0000	4.6103-08	0.0000	0.0000	0.0000
12	0.0000	6.1111-01	4.2634+02	5.8743-01	-2.5527-01	0.0000	-2.5527-01	0.0000	0.0000	1.3110-02
13	0.0000	1.2222+00	4.2634+02	5.8683-01	-5.5445-01	0.0000	-5.5445-01	0.0000	0.0000	5.2423-02
14	0.0000	1.8333+00	4.2634+02	5.8552-01	-9.5078-01	0.0000	-9.5078-01	0.0000	0.0000	1.1787-01
15	0.0000	2.4444+00	4.2634+02	5.8287-01	-1.5214+00	0.0000	-1.5214+00	0.0000	0.0000	2.0929-01
16	0.0000	3.0556+00	4.2634+02	5.7755-01	-2.3965+00	0.0000	-2.3965+00	0.0000	0.0000	3.2627-01
17	0.0000	3.6667+00	4.2634+02	5.6647-01	-3.3279+00	0.0000	-3.3279+00	0.0000	0.0000	4.6750-01
18	0.0000	4.2778+00	4.2634+02	5.4126-01	-5.3792+00	0.0000	-5.3792+00	0.0000	0.0000	6.3166-01
19	0.0000	4.8889+00	4.2634+02	4.7361-01	-1.1565+01	0.0000	-1.1565+01	0.0000	0.0000	9.0633-01
20	0.0000	5.5000+00	4.2634+02	2.1570-01	-2.2763+01	0.0000	-2.2763+01	0.0000	0.0000	9.4252-01
	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9.4252-01
	5.0000-01	0.0000		6.3364-01	4.1648-08	0.0000	0.0000	0.0000	0.0000	0.0000
21	5.0000-01	0.0000	5.2396+02	6.3364-01	4.1648-08	0.0000	4.1648-08	0.0000	0.0000	0.0000
22	5.0000-01	5.6922-01	5.2396+02	6.3378-01	-2.3873-01	0.0000	-2.3873-01	0.0000	0.0000	1.1950-02
23	5.0000-01	1.1334+00	5.2396+02	6.3418-01	-5.1837-01	0.0000	-5.1837-01	0.0000	0.0000	4.7808-02
24	5.0000-01	1.7076+00	5.2396+02	6.3479-01	-8.8806-01	0.0000	-8.8806-01	0.0000	0.0000	1.0759-01
25	5.0000-01	2.2759+00	5.2396+02	6.3549-01	-1.4179+00	0.0000	-1.4179+00	0.0000	0.0000	1.9133-01
26	5.0000-01	2.8451+00	5.2396+02	6.3611-01	-2.2243+00	0.0000	-2.2243+00	0.0000	0.0000	2.9901-01
27	5.0000-01	3.4153+00	5.2396+02	6.3658-01	-3.5309+00	0.0000	-3.5309+00	0.0000	0.0000	4.3057-01
28	5.0000-01	3.9845+00	5.2396+02	6.3604-01	-5.8408+00	0.0000	-5.8408+00	0.0000	0.0000	5.8568-01
29	5.0000-01	4.5537+00	5.2396+02	6.3580-01	-1.0525+01	0.0000	-1.0525+01	0.0000	0.0000	7.8322-01
30	5.0000-01	5.1229+00	5.2396+02	6.5575-01	-2.2221+01	0.0000	-2.2221+01	0.0000	0.0000	9.5879-01
	5.0000-01	5.2392+00		6.7594-01	-2.6209+01	0.0000	-2.6209+01	0.0000	0.0000	1.0000+00
	1.0000+00	0.0000		6.6705-01	3.7098-08	0.0000	0.0000	0.0000	0.0000	0.0000
31	1.0000+00	0.0000	5.6022+02	6.6705-01	3.7098-08	0.0000	3.7098-08	0.0000	0.0000	0.0000
32	1.0000+00	5.4730-01	5.6022+02	6.6752-01	-1.9186-01	0.0000	-1.9186-01	0.0000	0.0000	1.1342-02
33	1.0000+00	1.0946+00	5.6022+02	6.6899-01	-4.1873-01	0.0000	-4.1873-01	0.0000	0.0000	4.5394-02
34	1.0000+00	1.6419+00	5.6022+02	6.7157-01	-7.2100-01	0.0000	-7.2100-01	0.0000	0.0000	1.0223-01
35	1.0000+00	2.1892+00	5.6022+02	6.7555-01	-1.1524+00	0.0000	-1.1524+00	0.0000	0.0000	1.7799-01
36	1.0000+00	2.7365+00	5.6022+02	6.8159-01	-1.7932+00	0.0000	-1.7932+00	0.0000	0.0000	2.8471-01
37	1.0000+00	3.2838+00	5.6022+02	6.9122-01	-2.7763+00	0.0000	-2.7763+00	0.0000	0.0000	4.1134-01
38	1.0000+00	3.8311+00	5.6022+02	7.0848-01	-4.3407+00	0.0000	-4.3407+00	0.0000	0.0000	5.6196-01
39	1.0000+00	4.3784+00	5.6022+02	7.4575-01	-6.9337+00	0.0000	-6.9337+00	0.0000	0.0000	7.3937-01
40	1.0000+00	4.9257+00	5.6022+02	8.4781-01	-1.1279+01	0.0000	-1.1279+01	0.0000	0.0000	9.4270-01
	1.0000+00	5.0650+00		8.9945-01	-1.2766+01	0.0000	-1.2766+01	0.0000	0.0000	1.0000+00
	1.5000+00	0.0000		6.8967-01	3.2644-08	0.0000	0.0000	0.0000	0.0000	0.0000
41	1.5000+00	0.0000	5.7578+02	6.8967-01	3.2644-08	0.0000	3.2644-08	0.0000	0.0000	0.0000
42	1.5000+00	5.3707-01	5.7578+02	6.9047-01	-1.1477-01	0.0000	-1.1477-01	0.0000	0.0000	1.1110-02
43	1.5000+00	1.0741+00	5.7578+02	6.9292-01	-2.5664-01	0.0000	-2.5664-01	0.0000	0.0000	4.4475-02

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44	1.5000+00	1.6112+00	5.7578+02	6.9727-01	-4.5476-01	0.0000	-4.5476-01	0.0000	0.0000	1.0021-01
45	1.5000+00	2.1493+00	5.7578+02	7.0406-01	-7.4284-01	0.0000	-7.4284-01	0.0000	0.0000	1.7854-01
46	1.5000+00	2.6854+00	5.7578+02	7.1434-01	-1.1612+00	0.0000	-1.1612+00	0.0000	0.0000	2.7979-01
47	1.5000+00	3.2224+00	5.7578+02	7.3032-01	-1.7546+00	0.0000	-1.7546+00	0.0000	0.0000	4.0454-01
48	1.5000+00	3.7595+00	5.7578+02	7.5686-01	-2.5496+00	0.0000	-2.5496+00	0.0000	0.0000	5.5370-01
49	1.5000+00	4.2956+00	5.7578+02	8.0562-01	-3.4398+00	0.0000	-3.4398+00	0.0000	0.0000	7.2866-01
50	1.5000+00	4.9336+00	5.7578+02	9.1099-01	-3.6879+00	0.0000	-3.6879+00	0.0000	0.0000	9.3233-01
	1.5000+00	4.9958+00		9.7138-01	-3.2884+00	0.0000	-3.2884+00	0.0000	0.0000	1.0000+00
	1.5980+00	3.0000		6.9266-01	3.0943-08	0.0000	0.0000	0.0000	0.0000	0.0000
51	1.5980+00	3.0000	5.7710+02	6.9266-01	3.0943-08	0.0000	3.0943-08	0.0000	0.0000	0.0000
52	1.5980+00	5.3550-01	5.7710+02	6.9356-01	-7.6611-02	0.0000	-7.6611-02	0.0000	0.0000	1.1060-02
53	1.5980+00	1.0710+00	5.7710+02	5.9633-01	-1.7701-01	0.0000	-1.7701-01	0.0000	0.0000	4.4282-02
54	1.5980+00	1.6055+00	5.7710+02	7.0125-01	-3.2574-01	0.0000	-3.2574-01	0.0000	0.0000	9.9794-02
55	1.5980+00	2.1420+00	5.7710+02	7.0887-01	-5.4282-01	0.0000	-5.4282-01	0.0000	0.0000	1.7783-01
56	1.5980+00	2.6775+00	5.7710+02	7.2030-01	-8.7223-01	0.0000	-8.7223-01	0.0000	0.0000	2.7877-01
57	1.5980+00	3.2130+00	5.7710+02	7.3771-01	-1.3132+00	0.0000	-1.3132+00	0.0000	0.0000	4.0321-01
58	1.5980+00	3.7495+00	5.7710+02	7.6549-01	-1.8437+00	0.0000	-1.8437+00	0.0000	0.0000	5.5207-01
59	1.5980+00	4.2840+00	5.7710+02	8.1279-01	-2.2543+00	0.0000	-2.2543+00	0.0000	0.0000	7.2681-01
60	1.5980+00	4.8195+00	5.7710+02	8.9835-01	-1.5684+00	0.0000	-1.5684+00	0.0000	0.0000	9.2924-01
	1.5980+00	4.9907+00		9.4225-01	-5.7582-01	0.0000	-5.7582-01	0.0000	0.0000	1.0000+00
	2.5980+00	0.0000		6.8144-01	2.3198-08	0.0000	0.0000	0.0000	0.0000	0.0000
61	2.5980+00	0.0000	5.7060+02	6.8144-01	2.3198-08	0.0000	2.3198-08	0.0000	0.0000	0.0000
62	2.5980+00	5.3059-01	5.7060+02	5.8263-01	1.6729-01	0.0000	1.6729-01	0.0000	0.0000	1.0745-02
63	2.5980+00	1.0610+00	5.7060+02	5.8623-01	3.2493-01	0.0000	3.2493-01	0.0000	0.0000	4.3034-02
64	2.5980+00	1.5915+00	5.7060+02	5.9241-01	4.6711-01	0.0000	4.6711-01	0.0000	0.0000	9.7035-02
65	2.5980+00	2.1220+00	5.7060+02	7.0152-01	5.9605-01	0.0000	5.9605-01	0.0000	0.0000	1.7303-01
66	2.5980+00	2.6524+00	5.7060+02	7.1411-01	7.2829-01	0.0000	7.2829-01	0.0000	0.0000	2.7143-01
67	2.5980+00	3.1829+00	5.7060+02	7.3098-01	9.0456-01	0.0000	9.0456-01	0.0000	0.0000	3.9280-01
68	2.5980+00	3.7134+00	5.7060+02	7.5300-01	1.2039+00	0.0000	1.2039+00	0.0000	0.0000	5.3781-01
69	2.5980+00	4.2439+00	5.7060+02	7.8033-01	1.7498+00	0.0000	1.7498+00	0.0000	0.0000	7.0723-01
70	2.5980+00	4.7744+00	5.7060+02	8.1072-01	2.6487+00	0.0000	2.6487+00	0.0000	0.0000	9.0161-01
	2.5980+00	5.0197+00		8.2455-01	3.1694+00	0.0000	3.1694+00	0.0000	0.0000	1.0000+00
	3.5980+00	0.0000		6.4547-01	1.7159-08	0.0000	0.0000	0.0000	0.0000	0.0000
71	3.5980+00	0.0000	5.5329+02	6.4547-01	1.7159-08	0.0000	1.7159-08	0.0000	0.0000	0.0000
72	3.5980+00	5.3948-01	5.5329+02	6.4678-01	4.7485-01	0.0000	4.7485-01	0.0000	0.0000	1.0805-02
73	3.5980+00	1.0790+00	5.5329+02	6.5066-01	9.3769-01	0.0000	9.3769-01	0.0000	0.0000	4.3286-02
74	3.5980+00	1.6194+00	5.5329+02	6.5701-01	1.3842+00	0.0000	1.3842+00	0.0000	0.0000	9.7640-02
75	3.5980+00	2.1579+00	5.5329+02	6.6571-01	1.8229+00	0.0000	1.8229+00	0.0000	0.0000	1.7417-01
76	3.5980+00	2.6974+00	5.5329+02	6.7664-01	2.2781+00	0.0000	2.2781+00	0.0000	0.0000	2.7329-01
77	3.5980+00	3.2359+00	5.5329+02	6.8969-01	2.7889+00	0.0000	2.7889+00	0.0000	0.0000	3.9545-01
78	3.5980+00	3.7763+00	5.5329+02	7.0460-01	3.4045+00	0.0000	3.4045+00	0.0000	0.0000	5.4115-01
79	3.5980+00	4.3158+00	5.5329+02	7.2090-01	4.1727+00	0.0000	4.1727+00	0.0000	0.0000	7.1084-01
80	3.5980+00	4.8553+00	5.5329+02	7.3791-01	5.1247+00	0.0000	5.1247+00	0.0000	0.0000	9.0437-01
	3.5980+00	5.0976+00		7.4563-01	5.6189+00	0.0000	5.6189+00	0.0000	0.0000	1.0000+00
	1.1600+01	2.3992+00		6.1106-01	4.3683-01	0.0000	4.3683-01	0.0000	0.0000	0.0000
81	1.1600+01	2.6458+00	4.7545+02	5.9535-01	2.0111+00	0.0000	2.0111+00	0.0000	0.0000	4.4343-02
82	1.1600+01	2.8905+00	4.7545+02	5.7710-01	2.8544+00	0.0000	2.8544+00	0.0000	0.0000	1.1234-01
83	1.1600+01	3.3351+00	4.7545+02	5.6288-01	3.1077+00	0.0000	3.1077+00	0.0000	0.0000	1.8731-01
84	1.1600+01	3.8798+00	4.7545+02	5.5147-01	3.0908+00	0.0000	3.0908+00	0.0000	0.0000	2.6925-01
85	1.1600+01	4.0245+00	4.7545+02	5.4203-01	2.9312+00	0.0000	2.9312+00	0.0000	0.0000	3.5815-01
86	1.1600+01	4.3691+00	4.7545+02	5.3399-01	2.6851+00	0.0000	2.6851+00	0.0000	0.0000	4.5400-01
87	1.1600+01	4.7138+00	4.7545+02	5.2668-01	2.3729+00	0.0000	2.3729+00	0.0000	0.0000	5.5675-01
88	1.1600+01	5.0595+00	4.7545+02	5.2039-01	1.9926+00	0.0000	1.9926+00	0.0000	0.0000	6.6635-01
89	1.1600+01	5.4031+00	4.7545+02	5.1425-01	1.5187+00	0.0000	1.5187+00	0.0000	0.0000	7.6274-01
90	1.1600+01	5.7478+00	4.7545+02	5.0819-01	1.7715-01	0.0000	1.7715-01	0.0000	0.0000	9.0581-01
	1.1600+01	5.0000+00		5.0335-01	1.7417-01	0.0000	1.7417-01	0.0000	0.0000	1.0000+00

RELATIVE ROTOR INLET DATA

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X = 11.6000		UTIP = .0000							
Y	U	VZPRIME	VPRIM	MPRIME	BETAPR	VZPRST	VPRST	MPRS	BETAPS
2.3992+00	0.0000	0.0000	5.1824+02	5.1106-01	0.0000	0.0000	6.1824+02	6.1106-01	0.0000
2.6458+00	0.0000	0.0000	5.0342+02	5.9535-01	0.0000	0.0000	6.0342+02	5.9535-01	0.0000
2.9905+00	0.0000	0.0000	5.8609+02	5.7710-01	0.0000	0.0000	5.8609+02	5.7710-01	0.0000
3.3351+00	0.0000	0.0000	5.7252+02	5.6288-01	0.0000	0.0000	5.7252+02	5.6288-01	0.0000
3.6798+00	0.0000	0.0000	5.6158+02	5.5147-01	0.0000	0.0000	5.6158+02	5.5147-01	0.0000
4.0245+00	0.0000	0.0000	5.5251+02	5.4203-01	0.0000	0.0000	5.5251+02	5.4203-01	0.0000
4.3691+00	0.0000	0.0000	5.4475+02	5.3399-01	0.0000	0.0000	5.4475+02	5.3399-01	0.0000
4.7138+00	0.0000	0.0000	5.3789+02	5.2688-01	0.0000	0.0000	5.3789+02	5.2688-01	0.0000
5.0585+00	0.0000	0.0000	5.3161+02	5.2039-01	0.0000	0.0000	5.3161+02	5.2039-01	0.0000
5.4031+00	0.0000	0.0000	5.2565+02	5.1425-01	0.0000	0.0000	5.2565+02	5.1425-01	0.0000
5.7478+00	0.0000	0.0000	5.1976+02	5.0819-01	0.0000	0.0000	5.1976+02	5.0819-01	0.0000
6.0925+00	0.0000	0.0000	5.1505+02	5.0335-01	0.0000	0.0000	5.1505+02	5.0335-01	0.0000

RAKE WEIGHT FLOW DATA

I	X	(Q(I)-QBAR)/QBAR	QS TOT	QFR	QSTOTCR/ARAKE	QBAR	QWALL	QSTOT/QWALL
1	-5.0000-01	3.2425-01	1.3534+01	1.0000+00				
2	0.0000	-5.7484-02	1.1056+01	1.0000+00				
3	5.0000-01	-5.0493-03	1.1672+01	1.0000+00	4.2410+01	6.2048-01	1.0963+01	1.0646+00
4	1.0000+00	-3.7901-03	1.1686+01	1.0000+00	4.5399+01	7.0838-01	1.2295+01	9.5047-01
5	1.5000+00	-4.0959-03	1.1583+01	1.0000+00	4.6651+01	7.5580-01	1.2346+01	9.4629-01
6	1.6980+00	-3.3770-03	1.1691+01	1.0000+00	4.6800+01	7.6215-01	1.2308+01	9.4986-01
7	2.6980+00	-9.2453-04	1.1720+01	1.0000+00	4.6373+01	7.4445-01	1.2120+01	9.6701-01
8	3.6980+00	-5.8740-04	1.1724+01	1.0000+00	4.4982+01	6.9440-01	1.2036+01	9.7405-01
9	1.1600+01	0.0000	1.1731+01	1.0000+00	3.8671+01	5.3533-01	1.1241+01	1.0436+00

STREAMLINES

X = -.500	
QSTRM	YSTRM
1.00000-01	1.66143+00
2.00000-01	2.37658+00
3.00000-01	2.93716+00
4.00000-01	3.39004+00
5.00000-01	3.80748+00
6.00000-01	4.19112+00
7.00000-01	4.55573+00
8.00000-01	4.90913+00
9.00000-01	5.25328+00
1.00000+00	5.59089+00

X = .000	
QSTRM	YSTRM
1.00000-01	1.63546+00
2.00000-01	2.38234+00
3.00000-01	2.91832+00
4.00000-01	3.37391+00
5.00000-01	3.78719+00
6.00000-01	4.16150+00
7.00000-01	4.51815+00
8.00000-01	4.85683+00
9.00000-01	5.17922+00

X = .500

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QSTRM	YSTRM
1.00000-01	1.63534+00
2.00000-01	2.32269+00
3.00000-01	2.85034+00
4.00000-01	3.28303+00
5.00000-01	3.67009+00
6.00000-01	4.03043+00
7.00000-01	4.35104+00
8.00000-01	4.66078+00
9.00000-01	4.95184+00
1.00000+00	5.23823+00

X = 1.000

QSTRM	YSTRM
1.00000-01	1.62041+00
2.00000-01	2.28495+00
3.00000-01	2.80183+00
4.00000-01	3.23472+00
5.00000-01	3.60595+00
6.00000-01	3.94924+00
7.00000-01	4.25983+00
8.00000-01	4.54383+00
9.00000-01	4.81143+00
1.00000+00	5.06604+00

X = 1.500

QSTRM	YSTRM
1.00000-01	1.60915+00
2.00000-01	2.26212+00
3.00000-01	2.77235+00
4.00000-01	3.20289+00
5.00000-01	3.56615+00
6.00000-01	3.90197+00
7.00000-01	4.20810+00
8.00000-01	4.48436+00
9.00000-01	4.74832+00
1.00000+00	4.99684+00

X = 1.698

QSTRM	YSTRM
1.00000-01	1.60790+00
2.00000-01	2.25959+00
3.00000-01	2.76884+00
4.00000-01	3.19919+00
5.00000-01	3.56118+00
6.00000-01	3.89538+00
7.00000-01	4.20183+00
8.00000-01	4.47760+00
9.00000-01	4.74214+00
1.00000+00	4.99068+00

X = 2.698

QSTRM	YSTRM
1.00000-01	1.61216+00
2.00000-01	2.26735+00
3.00000-01	2.77731+00
4.00000-01	3.20928+00

- 400 -

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5.00000-01	3.57509+00
6.00000-01	3.90814+00
7.00000-01	4.22127+00
8.00000-01	4.49710+00
9.00000-01	4.77001+00
1.00000+00	5.01972+00

X = 3.698

QSTRM	YSTRM
1.00000-01	1.63506+00
2.00000-01	2.29847+00
3.00000-01	2.81534+00
4.00000-01	3.25370+00
5.00000-01	3.62397+00
6.00000-01	3.96343+00
7.00000-01	4.28135+00
8.00000-01	4.56372+00
9.00000-01	4.84176+00
1.00000+00	5.09763+00

X = 11.600

QSTRM	YSTRM
1.00000-01	2.92792+00
2.00000-01	3.38851+00
3.00000-01	3.79901+00
4.00000-01	4.17496+00
5.00000-01	4.52346+00
6.00000-01	4.84982+00
7.00000-01	5.15811+00
8.00000-01	5.45147+00
9.00000-01	5.73153+00
1.00000+00	6.00004+00

2 OF 2 THETAS

THETA = .18000+03 W0011 = 1.17400+01 VICI = 4.75459+02 V3 = -3.34406+02

HUB

ON-BODY POINTS

I	X	Y	VP	VTHETA	VRES	VBARI	BETA	S	M	RB/RT	PSOPTC
1	.8015+01	.1151+00	.4748+02	.2112-14	.4748+02	.4442+03	.2549-14	.9667-02	.4526-01	.8908	.9966
2	.8049+01	.3443+00	.1434+03	.2137-14	.1434+03	.4441+03	.8540-15	.2891-01	.1370+00	.8908	.9870
3	.8113+01	.5669+00	.2356+03	.2141-14	.2356+03	.4450+03	.5206-15	.4618-01	.2258+00	.8903	.9853
4	.8206+01	.7787+00	.3195+03	.2124-14	.3195+03	.4470+03	.3808-15	.6741-01	.3075+00	.8890	.9363
5	.8324+01	.9789+00	.3932+03	.2087-14	.3932+03	.4493+03	.3041-15	.8674-01	.3803+00	.8878	.9050
6	.8465+01	.1166+01	.4559+03	.2036-14	.4559+03	.4519+03	.2559-15	.1062+00	.4432+00	.8859	.8739
7	.8624+01	.1340+01	.5079+03	.1974-14	.5079+03	.4547+03	.2227-15	.1258+00	.4960+00	.8841	.8453
8	.8797+01	.1497+01	.5495+03	.1906-14	.5495+03	.4575+03	.1988-15	.1452+00	.5399+00	.8822	.8207
9	.8980+01	.1638+01	.5823+03	.1837-14	.5823+03	.4602+03	.1807-15	.1645+00	.5732+00	.8804	.8003
10	.9176+01	.1769+01	.6085+03	.1766-14	.6085+03	.4628+03	.1663-15	.1840+00	.6007+00	.8786	.7836
11	.9382+01	.1835+01	.6288+03	.1696-14	.6288+03	.4652+03	.1545-15	.2037+00	.6223+00	.8769	.7772
12	.9597+01	.1989+01	.6441+03	.1627-14	.6441+03	.4674+03	.1447-15	.2235+00	.6386+00	.8754	.6777
13	.9818+01	.2081+01	.6551+03	.1561-14	.6551+03	.4694+03	.1365-15	.2435+00	.6505+00	.8740	.7507
14	.1005+02	.2161+01	.6625+03	.1497-14	.6625+03	.4710+03	.1295-15	.2635+00	.6585+00	.8726	.7475
15	.1028+02	.2233+01	.6666+03	.1437-14	.6666+03	.4724+03	.1235-15	.2837+00	.6629+00	.8718	.7446

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16	.1052+02	.2285+01	.6677+03	.1379-14	.6677+03	.4735+03	.1184-15	.3039+09	.6641+00	.8710	.7439
17	.1076+02	.2331+01	.6658+03	.1324-14	.6658+03	.4743+03	.1140-15	.3242+00	.6620+00	.8704	.7452
18	.1100+02	.2365+01	.6605+03	.1272-14	.6605+03	.4749+03	.1103-15	.3446+00	.6563+00	.8700	.7488
19	.1124+02	.2387+01	.6510+03	.1222-14	.6510+03	.4753+03	.1075-15	.3650+00	.6460+00	.8698	.7553
20	.1149+02	.2395+01	.6317+03	.1173-14	.6313+03	.4754+03	.1065-15	.3854+00	.6249+00	.8696	.7686
21	.1174+02	.2403+01	.6044+03	.1126-14	.6044+03	.4755+03	.1067-15	.4062+00	.5964+00	.8696	.7862
22	.1202+02	.2400+01	.5840+03	.1077-14	.5840+03	.4755+03	.1057-15	.4296+00	.5749+00	.8696	.7993
23	.1236+02	.2400+01	.5722+03	.1022-14	.5722+03	.4755+03	.1024-15	.4575+00	.5626+00	.8696	.8067
24	.1276+02	.2400+01	.5636+03	.9604-15	.5636+03	.4755+03	.9763-16	.4911+00	.5536+00	.8696	.8121
25	.1324+02	.2403+01	.5573+03	.8913-15	.5573+03	.4755+03	.9163-16	.5314+00	.5470+00	.8696	.8159
26	.1383+02	.2403+01	.5529+03	.8174-15	.5529+03	.4755+03	.8471-16	.5798+00	.5424+00	.8696	.8186
27	.1452+02	.2400+01	.5500+03	.7434-15	.5500+03	.4755+03	.7745-16	.6378+00	.5394+00	.8696	.8204
28	.1536+02	.2400+01	.5482+03	.6771-15	.5482+03	.4755+03	.7077-16	.7075+00	.5376+00	.8696	.8214
29	.1632+02	.2403+01	.5474+03	.6322-15	.5474+03	.4755+03	.6618-16	.7674+00	.5367+00	.8696	.8220
30	.1733+02	.2403+01	.5470+03	.6206-15	.5470+03	.4755+03	.6591-16	.8713+00	.5363+00	.8696	.8222
31	.1834+02	.2403+01	.5469+03	.6459-15	.5469+03	.4755+03	.6767-16	.9552+00	.5362+00	.8696	.8223
32	.1935+02	.2400+01	.5468+03	.7101-15	.5468+03	.4755+03	.7441-16	.1039+01	.5361+00	.8696	.8223
33	.2036+02	.2400+01	.5468+03	.8174-15	.5468+03	.4755+03	.8565-16	.1123+01	.5361+00	.8696	.8223
34	.2137+02	.2403+01	.5468+03	.9742-15	.5468+03	.4755+03	.1021-15	.1207+01	.5361+00	.8696	.8223
35	.2238+02	.2403+01	.5468+03	.1190-14	.5468+03	.4755+03	.1247-15	.1291+01	.5361+00	.8696	.8223
36	.2339+02	.2400+01	.5468+03	.1479-14	.5468+03	.4755+03	.1549-15	.1375+01	.5361+00	.8696	.8223
37	.2440+02	.2403+01	.5468+03	.1657-14	.5468+03	.4755+03	.1946-15	.1458+01	.5361+00	.8696	.8223
38	.2541+02	.2400+01	.5468+03	.2347-14	.5468+03	.4755+03	.2460-15	.1542+01	.5361+00	.8696	.8223
39	.2641+02	.2403+01	.5468+03	.2980-14	.5468+03	.4755+03	.3123-15	.1626+01	.5361+00	.8696	.8223
40	.2742+02	.2403+01	.5468+03	.3793-14	.5468+03	.4755+03	.3975-15	.1710+01	.5361+00	.8696	.8223
41	.2843+02	.2403+01	.5468+03	.4834-14	.5468+03	.4755+03	.5065-15	.1794+01	.5361+00	.8696	.8223
42	.2944+02	.2403+01	.5469+03	.6161-14	.5469+03	.4755+03	.6454-15	.1878+01	.5362+00	.8696	.8223
43	.3045+02	.2403+01	.5471+03	.7844-14	.5471+03	.4755+03	.8214-15	.1962+01	.5364+00	.8696	.8221
44	.3146+02	.2400+01	.5476+03	.9955-14	.5476+03	.4755+03	.1042-14	.2046+01	.5370+00	.8696	.8218
45	.3247+02	.2400+01	.5489+03	.1255-13	.5489+03	.4755+03	.1310-14	.2129+01	.5383+00	.8696	.8211
46	.3348+02	.2403+01	.5519+03	.1559-13	.5519+03	.4755+03	.1619-14	.2213+01	.5414+00	.8696	.8193
47	.3449+02	.2400+01	.5585+03	.1881-13	.5585+03	.4755+03	.1938-14	.2297+01	.5483+00	.8696	.8152
48	.3550+02	.2400+01	.5726+03	.2125-13	.5726+03	.4755+03	.2128-14	.2381+01	.5630+00	.8696	.8065

SHROUD
ON-BODY POINTS

I	X	Y	VP	VTHETA	VRES	VBARI	BETA	S	M	RB/RT	PSOPTC
49	.3550+02	.6003+01	-.5126+03	.1402-13	.5126+03	.4755+03	-.1568-14	.2927+01	.5008+00	.8696	.8426
50	.3449+02	.6000+01	-.5347+03	.1016-13	.5347+03	.4755+03	-.1089-14	.2903+01	.5236+00	.8696	.8296
51	.3348+02	.6003+01	-.5426+03	.7678-14	.5426+03	.4755+03	-.8105-15	.2819+01	.5317+00	.8696	.8245
52	.3247+02	.6003+01	-.5452+03	.5907-14	.5452+03	.4755+03	-.6208-15	.2735+01	.5344+00	.8696	.8233
53	.3146+02	.6003+01	-.5461+03	.4524-14	.5461+03	.4755+03	-.4810-15	.2652+01	.5354+00	.8696	.8227
54	.3045+02	.6003+01	-.5465+03	.3573-14	.5465+03	.4755+03	-.3746-15	.2568+01	.5358+00	.8696	.8225
55	.2944+02	.6003+01	-.5467+03	.2792-14	.5467+03	.4755+03	-.2926-15	.2484+01	.5360+00	.8696	.8224
56	.2843+02	.6000+01	-.5467+03	.2185-14	.5467+03	.4755+03	-.2290-15	.2400+01	.5360+00	.8696	.8224
57	.2742+02	.6003+01	-.5467+03	.1712-14	.5467+03	.4755+03	-.1794-15	.2316+01	.5363+00	.8696	.8224
58	.2641+02	.6003+01	-.5468+03	.1344-14	.5468+03	.4755+03	-.1409-15	.2232+01	.5361+00	.8696	.8224
59	.2541+02	.6003+01	-.5468+03	.1058-14	.5468+03	.4755+03	-.1109-15	.2148+01	.5361+00	.8696	.8224
60	.2440+02	.6003+01	-.5468+03	.8371-15	.5468+03	.4755+03	-.8772-16	.2064+01	.5361+00	.8696	.8224
61	.2339+02	.6003+01	-.5468+03	.6566-15	.5468+03	.4755+03	-.6985-16	.1981+01	.5361+00	.8696	.8224
62	.2239+02	.6003+01	-.5468+03	.5366-15	.5468+03	.4755+03	-.5623-16	.1897+01	.5361+00	.8696	.8224
63	.2137+02	.6003+01	-.5468+03	.4392-15	.5468+03	.4755+03	-.4602-16	.1813+01	.5361+00	.8696	.8224
64	.2036+02	.6003+01	-.5468+03	.3685-15	.5468+03	.4755+03	-.3861-16	.1729+01	.5361+00	.8696	.8224
65	.1935+02	.6003+01	-.5467+03	.3202-15	.5467+03	.4755+03	-.3355-16	.1645+01	.5360+00	.8696	.8224
66	.1834+02	.6003+01	-.5467+03	.2914-15	.5467+03	.4755+03	-.3054-16	.1561+01	.5360+00	.8696	.8224
67	.1733+02	.6003+01	-.5466+03	.2504-15	.5466+03	.4755+03	-.2939-16	.1477+01	.5359+00	.8696	.8225

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68	.1632+02	.6000+01	-.5463+03	.2866-15	.5463+03	.4755+03	-.3005-15	.1393+01	.5356+00	.8696	.8226
69	.1536+02	.6000+01	-.5458+03	.3092-15	.5458+03	.4755+03	-.3246-16	.1314+01	.5350+00	.8696	.8229
70	.1452+02	.6000+01	-.5447+03	.3435-15	.5447+03	.4755+03	-.3615-16	.1244+01	.5339+00	.8696	.8236
71	.1383+02	.6000+01	-.5429+03	.3847-15	.5429+03	.4755+03	-.4060-16	.1186+01	.5321+00	.8696	.8247
72	.1324+02	.6000+01	-.5404+03	.4297-15	.5404+03	.4755+03	-.4556-16	.1137+01	.5295+00	.8696	.8262
73	.1276+02	.6000+01	-.5370+03	.4768-15	.5370+03	.4755+03	-.5087-16	.1097+01	.5259+00	.8696	.8262
74	.1235+02	.6000+01	-.5327+03	.5253-15	.5327+03	.4755+03	-.5650-16	.1064+01	.5215+00	.8696	.8308
75	.1202+02	.6000+01	-.5275+03	.5754-15	.5275+03	.4755+03	-.6250-16	.1036+01	.5162+00	.8696	.8336
76	.1174+02	.6000+01	-.5201+03	.6313-15	.5201+03	.4755+03	-.6955-16	.1012+01	.5085+00	.8696	.838
77	.1148+02	.5999+01	-.5115+03	.7032-15	.5115+03	.4754+03	-.7877-16	.9912+00	.4997+00	.8696	.8432
78	.1123+02	.5995+01	-.5057+03	.7535-15	.5057+03	.4753+03	-.8539-16	.9703+00	.4937+00	.8696	.8465
79	.1098+02	.5989+01	-.5033+03	.7828-15	.5033+03	.4749+03	-.8911-16	.9495+00	.4913+00	.8700	.8479
80	.1074+02	.5978+01	-.5022+03	.8033-15	.5022+03	.4743+03	-.9164-16	.9289+00	.4902+00	.8705	.8485
81	.1049+02	.5964+01	-.5021+03	.8182-15	.5021+03	.4734+03	-.9337-16	.9084+00	.4901+00	.8711	.8486
82	.1024+02	.5948+01	-.5026+03	.8298-15	.5026+03	.4722+03	-.9460-16	.8879+00	.4906+00	.8720	.8483
83	.9999+01	.5929+01	-.5037+03	.8395-15	.5037+03	.4707+03	-.9549-16	.8675+00	.4917+00	.8731	.8477
84	.9756+01	.5907+01	-.5052+03	.8483-15	.5052+03	.4689+03	-.9622-16	.8472+00	.4932+00	.8744	.8468
85	.9514+01	.5884+01	-.5070+03	.8573-15	.5070+03	.4666+03	-.9688-16	.8270+00	.4951+00	.8760	.8458
86	.9272+01	.5858+01	-.5092+03	.8674-15	.5092+03	.4640+03	-.9761-16	.8068+00	.4973+00	.8778	.8445
87	.9032+01	.5831+01	-.5116+03	.8794-15	.5116+03	.4609+03	-.9849-16	.7867+00	.4998+00	.8799	.8431
88	.8792+01	.5802+01	-.5143+03	.8939-15	.5143+03	.4574+03	-.9958-16	.7666+00	.5026+00	.8823	.8416
89	.8552+01	.5771+01	-.5172+03	.9115-15	.5172+03	.4535+03	-.1010-15	.7465+00	.5056+00	.8849	.8399
90	.8313+01	.5739+01	-.5205+03	.9329-15	.5205+03	.4491+03	-.1027-15	.7265+00	.5089+00	.8877	.8380
91	.8074+01	.5706+01	-.5240+03	.9587-15	.5240+03	.4442+03	-.1048-15	.7064+00	.5125+00	.8908	.8359
92	.7835+01	.5673+01	-.5297+03	.9933-15	.5297+03	.4468+03	-.1074-15	.6864+00	.5184+00	.8891	.8326
93	.7598+01	.5638+01	-.5366+03	.1036-14	.5366+03	.4523+03	-.1106-15	.6665+00	.5255+00	.8856	.8285
94	.7361+01	.5603+01	-.5441+03	.1085-14	.5441+03	.4581+03	-.1143-15	.6465+00	.5333+00	.8818	.8240
95	.7123+01	.5567+01	-.5523+03	.1144-14	.5523+03	.4640+03	-.1187-15	.6265+00	.5418+00	.8778	.8190
96	.6885+01	.5531+01	-.5611+03	.1212-14	.5611+03	.4700+03	-.1237-15	.6065+00	.5509+00	.8736	.8136
97	.6648+01	.5494+01	-.5705+03	.1291-14	.5705+03	.4763+03	-.1296-15	.5865+00	.5608+00	.8690	.8077
98	.6410+01	.5458+01	-.5807+03	.1382-14	.5807+03	.4826+03	-.1363-15	.5665+00	.5715+00	.8642	.8014
99	.6172+01	.5422+01	-.5916+03	.1486-14	.5916+03	.4891+03	-.1440-15	.5466+00	.5829+00	.8592	.7945
100	.5935+01	.5385+01	-.6032+03	.1607-14	.6032+03	.4956+03	-.1526-15	.5266+00	.5951+00	.8539	.7870
101	.5697+01	.5351+01	-.6154+03	.1745-14	.6154+03	.5021+03	-.1624-15	.5066+00	.6081+00	.8483	.7790
102	.5459+01	.5317+01	-.6284+03	.1902-14	.6284+03	.5087+03	-.1734-15	.4866+00	.6219+00	.8424	.7705
103	.5221+01	.5283+01	-.6421+03	.2082-14	.6421+03	.5152+03	-.1856-15	.4667+00	.6365+00	.8364	.7614
104	.4983+01	.5252+01	-.6563+03	.2287-14	.6563+03	.5217+03	-.1997-15	.4467+00	.6516+00	.8300	.7517
105	.4744+01	.5218+01	-.6712+03	.2521-14	.6712+03	.5280+03	-.2152-15	.4267+00	.6679+00	.8235	.7415
106	.4505+01	.5183+01	-.6867+03	.2787-14	.6867+03	.5342+03	-.2326-15	.4066+00	.6847+00	.8168	.7307
107	.4266+01	.5159+01	-.7027+03	.3090-14	.7027+03	.5402+03	-.2520-15	.3866+00	.7022+00	.8099	.7195
108	.4026+01	.5132+01	-.7191+03	.3434-14	.7191+03	.5460+03	-.2736-15	.3665+00	.7203+00	.8029	.7076
109	.3785+01	.5105+01	-.7358+03	.3825-14	.7358+03	.5514+03	-.2978-15	.3464+00	.7388+00	.7959	.6958
110	.3543+01	.5083+01	-.7527+03	.4268-14	.7527+03	.5565+03	-.3249-15	.3262+00	.7578+00	.7890	.6835
111	.3301+01	.5062+01	-.7698+03	.4771-14	.7698+03	.5612+03	-.3551-15	.3060+00	.7770+00	.7822	.6710
112	.3058+01	.5043+01	-.7867+03	.5340-14	.7867+03	.5654+03	-.3889-15	.2857+00	.7962+00	.7758	.6585
113	.2813+01	.5026+01	-.8036+03	.5985-14	.8036+03	.5691+03	-.4267-15	.2653+00	.8155+00	.7698	.6459
114	.2568+01	.5013+01	-.8203+03	.6714-14	.8203+03	.5721+03	-.4690-15	.2449+00	.8348+00	.7646	.6334
115	.2321+01	.5002+01	-.8372+03	.7540-14	.8372+03	.5745+03	-.5160-15	.2244+00	.8545+00	.7603	.6206
116	.2073+01	.4995+01	-.8556+03	.8480-14	.8556+03	.5762+03	-.5679-15	.2037+00	.8761+00	.7572	.6066
117	.1823+01	.4991+01	-.8864+03	.9581-14	.8864+03	.5771+03	-.6193-15	.1830+00	.9128+00	.7555	.5831
118	.1612+01	.4992+01	-.9229+03	.1067-13	.9229+03	.5789+03	-.6623-15	.1654+00	.9571+00	.7560	.5550
119	.1445+01	.5000+01	-.9362+03	.1156-13	.9362+03	.5750+03	-.7078-15	.1515+00	.9735+00	.7595	.5447
120	.1287+01	.5015+01	-.9264+03	.1239-13	.9264+03	.5714+03	-.7664-15	.1383+00	.9615+00	.7659	.5322
121	.1137+01	.5039+01	-.9047+03	.1317-13	.9047+03	.5663+03	-.8339-15	.1257+00	.9349+00	.7743	.5690
122	.9958+00	.5067+01	-.8742+03	.1389-13	.8742+03	.5600+03	-.9107-15	.1137+00	.8982+00	.7840	.5924
123	.8630+00	.5101+01	-.8367+03	.1458-13	.8367+03	.5526+03	-.9933-15	.1023+00	.8540+00	.7943	.6209
124	.7385+00	.5140+01	-.7931+03	.1522-13	.7931+03	.5443+03	-.1100-14	.9150+01	.8035+00	.8050	.6537

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125	.6222+00	.5183+01	-.7433+03	.1583-13	.7433+03	.5352+03	-.1220-14	.8118-01	.7472+00	.8157	.6904
126	.5142+00	.5231+01	-.6867+03	.1639-13	.6867+03	.5254+03	-.1368-14	.7134-01	.6848+00	.8262	.7307
127	.4154+00	.5284+01	-.6229+03	.1691-13	.6229+03	.5150+03	-.1555-14	.6205-01	.6150+00	.8365	.7741
128	.3262+00	.5342+01	-.5506+03	.1737-13	.5506+03	.5043+03	-.1808-14	.5329-01	.5400+00	.8464	.8209
129	.2453+00	.5403+01	-.4674+03	.1777-13	.4674+03	.4431+03	-.2178-14	.4498-01	.4548+00	.8559	.8678
130	.1761+00	.5463+01	-.3713+03	.1810-13	.3713+03	.4817+03	-.2793-14	.3710-01	.3585+00	.8650	.9150
131	.1177+00	.5529+01	-.2629+03	.1834-13	.2629+03	.4703+03	-.3977-14	.2977-01	.2523+00	.8734	.9567
132	.7108-01	.5597+01	-.1424+03	.1850-13	.1424+03	.4590+03	-.7443-14	.2296-01	.1360+00	.8812	.9872
133	.3566-01	.5667+01	-.8205+01	.1856-13	.8205+01	.4477+03	-.1296-12	.1644-01	.7823-02	.8886	1.0000
134	.1221-01	.5738+01	.1525+03	.2055-13	.1525+03	.5714+03	.7221-14	.1018-01	.1457+00	.7658	.9853
135	.1035-02	.5807+01	.3573+03	.2299-13	.3573+03	.5714+03	.3686-14	.4388-02	.3447+00	.7658	.9211
136	.2703-02	.5874+01	.6523+03	.2616-13	.6523+03	.5714+03	.2298-14	-.1215-02	.6475+00	.7658	.7544
137	.2326-01	.5937+01	.9682+03	.2952-13	.9682+03	.5714+03	.1747-14	-.6723-02	.1014+01	.7658	.5200
138	.5969-01	.5988+01	.1097+04	.3135-13	.1097+04	.5714+03	.1637-14	-.1190-01	.1184+01	.7656	.4211
139	.1022+00	.6027+01	.1126+04	.3227-13	.1126+04	.5714+03	.1642-14	-.1671-01	.1224+01	.7658	.3998
140	.1492+00	.6061+01	.1123+04	.3286-13	.1123+04	.5714+03	.1677-14	-.2150-01	.1219+01	.7656	.4020
141	.2038+00	.6092+01	.1109+04	.3333-13	.1109+04	.5714+03	.1722-14	-.2676-01	.1200+01	.7656	.4124
142	.2656+00	.6122+01	.1091+04	.3375-13	.1091+04	.5714+03	.1772-14	-.3247-01	.1175+01	.7656	.4259
143	.3342+00	.6151+01	.1073+04	.3413-13	.1073+04	.5714+03	.1823-14	-.3866-01	.1150+01	.7656	.4399
144	.4098+00	.6179+01	.1055+04	.3449-13	.1055+04	.5714+03	.1874-14	-.4535-01	.1126+01	.7656	.4535
145	.4926+00	.6205+01	.1038+04	.3485-13	.1038+04	.5714+03	.1923-14	-.5257-01	.1104+01	.7656	.4662
146	.5828+00	.6231+01	.1023+04	.3519-13	.1023+04	.5714+03	.1971-14	-.6037-01	.1084+01	.7656	.4779
147	.6808+00	.6256+01	.1009+04	.3554-13	.1009+04	.5714+03	.2018-14	-.6877-01	.1065+01	.7656	.4886
148	.7872+00	.6280+01	.9960+03	.3588-13	.9960+03	.5714+03	.2064-14	-.7784-01	.1049+01	.7658	.4985
149	.9024+00	.6303+01	.9843+03	.3623-13	.9843+03	.5714+03	.2109-14	-.8761-01	.1034+01	.7656	.5076
150	.1027+01	.6325+01	.9735+03	.3657-13	.9735+03	.5714+03	.2152-14	-.9814-01	.1020+01	.7656	.5159
151	.1162+01	.6347+01	.9635+03	.3692-13	.9635+03	.5714+03	.2195-14	-.1095+00	.1008+01	.7658	.5236
152	.1308+01	.6367+01	.9542+03	.3726-13	.9542+03	.5714+03	.2237-14	-.1217+00	.9959+00	.7658	.5308
153	.1465+01	.6386+01	.9454+03	.3761-13	.9454+03	.5714+03	.2279-14	-.1349+00	.9850+00	.7658	.5378
154	.1635+01	.6404+01	.9371+03	.3795-13	.9371+03	.5714+03	.2321-14	-.1491+00	.9746+00	.7658	.5440
155	.1818+01	.6420+01	.9289+03	.3830-13	.9289+03	.5714+03	.2362-14	-.1644+00	.9646+00	.7658	.5503
156	.2016+01	.6434+01	.9207+03	.3865-13	.9207+03	.5714+03	.2405-14	-.1809+00	.9544+00	.7658	.5567
157	.2230+01	.6445+01	.9118+03	.3900-13	.9118+03	.5714+03	.2450-14	-.1987+00	.9435+00	.7658	.5635
158	.2461+01	.6452+01	.8958+03	.3928-13	.8958+03	.5714+03	.2513-14	-.2179+00	.9241+00	.7658	.5759
159	.2710+01	.6453+01	.8678+03	.3945-13	.8678+03	.5714+03	.2605-14	-.2386+00	.8906+00	.7658	.5973
160	.2968+01	.6453+01	.8443+03	.3963-13	.8443+03	.5714+03	.2689-14	-.2600+00	.8629+00	.7658	.6152
161	.3226+01	.6453+01	.8314+03	.3988-13	.8314+03	.5714+03	.2748-14	-.2815+00	.8478+00	.7658	.6250
162	.3484+01	.6453+01	.8218+03	.4013-13	.8218+03	.5714+03	.2798-14	-.3029+00	.8366+00	.7658	.6322
163	.3742+01	.6453+01	.8142+03	.4037-13	.8142+03	.5714+03	.2841-14	-.3244+00	.8278+00	.7658	.6379
164	.4000+01	.6453+01	.8080+03	.4060-13	.8080+03	.5714+03	.2879-14	-.3458+00	.8206+00	.7658	.6426
165	.4258+01	.6453+01	.8029+03	.4082-13	.8029+03	.5714+03	.2913-14	-.3673+00	.8147+00	.7658	.6485
166	.4516+01	.6453+01	.7985+03	.4103-13	.7985+03	.5714+03	.2944-14	-.3887+00	.8096+00	.7658	.6498
167	.4774+01	.6453+01	.7947+03	.4122-13	.7947+03	.5714+03	.2972-14	-.4102+00	.8053+00	.7658	.6526
168	.5032+01	.6453+01	.7913+03	.4141-13	.7913+03	.5714+03	.2998-14	-.4316+00	.8015+00	.7658	.6551
169	.5290+01	.6453+01	.7871+03	.4159-13	.7871+03	.5714+03	.3022-14	-.4531+00	.7981+00	.7658	.6572
170	.5548+01	.6453+01	.7858+03	.4175-13	.7858+03	.5714+03	.3044-14	-.4745+00	.7952+00	.7658	.6592
171	.5806+01	.6453+01	.7835+03	.4191-13	.7835+03	.5714+03	.3065-14	-.4959+00	.7925+00	.7658	.6609
172	.6064+01	.6453+01	.7814+03	.4206-13	.7814+03	.5714+03	.3084-14	-.5174+00	.7902+00	.7658	.6624
173	.6322+01	.6453+01	.7795+03	.4220-13	.7795+03	.5714+03	.3102-14	-.5388+00	.7880+00	.7658	.6636
174	.6580+01	.6453+01	.7778+03	.4234-13	.7778+03	.5714+03	.3119-14	-.5603+00	.7861+00	.7658	.6651
175	.6838+01	.6453+01	.7763+03	.4247-13	.7763+03	.5714+03	.3134-14	-.5817+00	.7843+00	.7658	.6662
176	.7096+01	.6453+01	.7746+03	.4259-13	.7746+03	.5714+03	.3149-14	-.6032+00	.7827+00	.7658	.6673
177	.7354+01	.6453+01	.7735+03	.4270-13	.7735+03	.5714+03	.3163-14	-.6246+00	.7812+00	.7658	.6683
178	.7612+01	.6453+01	.7723+03	.4281-13	.7723+03	.5714+03	.3176-14	-.6461+00	.7798+00	.7658	.6691
179	.7870+01	.6453+01	.7712+03	.4291-13	.7712+03	.5714+03	.3188-14	-.6675+00	.7786+00	.7658	.6700
180	.8128+01	.6453+01	.7702+03	.4301-13	.7702+03	.5714+03	.3200-14	-.6890+00	.7774+00	.7658	.6707
181	.8386+01	.6453+01	.7692+03	.4311-13	.7692+03	.5714+03	.3211-14	-.7104+00	.7763+00	.7658	.6714

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182	.8644+01	.6453+01	.7683+03	.4319-13	.7683+03	.5714+03	.3221-14	-.7317+00	.7753+00	.7658	.6721
183	.8902+01	.6453+01	.7675+03	.4328-13	.7675+03	.5714+03	.3231-14	-.7333+00	.7744+00	.7658	.6727
184	.9160+01	.6453+01	.7667+03	.4336-13	.7667+03	.5714+03	.3240-14	-.7747+00	.7735+00	.7658	.6733
185	.9418+01	.6453+01	.7660+03	.4344-13	.7660+03	.5714+03	.3249-14	-.7962+00	.7727+00	.7658	.6738
186	.9675+01	.6453+01	.7653+03	.4351-13	.7653+03	.5714+03	.3257-14	-.8176+00	.7719+00	.7658	.6743
187	.9934+01	.6453+01	.7647+03	.4358-13	.7647+03	.5714+03	.3265-14	-.8391+00	.7712+00	.7658	.6748
188	.1019+02	.6453+01	.7641+03	.4364-13	.7641+03	.5714+03	.3272-14	-.8605+00	.7705+00	.7658	.6752
189	.1045+02	.6453+01	.7635+03	.4370-13	.7635+03	.5714+03	.3280-14	-.8820+00	.7699+00	.7658	.6756
190	.1071+02	.6453+01	.7630+03	.4376-13	.7630+03	.5714+03	.3286-14	-.9034+00	.7693+00	.7658	.6760
191	.1097+02	.6453+01	.7625+03	.4382-13	.7625+03	.5714+03	.3293-14	-.9249+00	.7687+00	.7658	.6764
192	.1122+02	.6453+01	.7620+03	.4387-13	.7620+03	.5714+03	.3299-14	-.9463+00	.7682+00	.7658	.6768
193	.1148+02	.6453+01	.7615+03	.4392-13	.7615+03	.5714+03	.3304-14	-.9678+00	.7676+00	.7658	.6771
194	.1174+02	.6453+01	.7611+03	.4397-13	.7611+03	.5714+03	.3310-14	-.9892+00	.7672+00	.7658	.6774
195	.1202+02	.6453+01	.7608+03	.4402-13	.7608+03	.5714+03	.3315-14	-.1013+01	.7668+00	.7658	.6777
196	.1235+02	.6453+01	.7603+03	.4407-13	.7603+03	.5714+03	.3321-14	-.1041+01	.7662+00	.7658	.6780
197	.1277+02	.6453+01	.7597+03	.4413-13	.7597+03	.5714+03	.3328-14	-.1075+01	.7656+00	.7658	.6784
198	.1325+02	.6453+01	.7591+03	.4420-13	.7591+03	.5714+03	.3336-14	-.1115+01	.7650+00	.7658	.6788
199	.1385+02	.6453+01	.7585+03	.4426-13	.7585+03	.5714+03	.3344-14	-.1165+01	.7642+00	.7658	.6793
200	.1456+02	.6453+01	.7578+03	.4433-13	.7578+03	.5714+03	.3352-14	-.1223+01	.7635+00	.7658	.6798
201	.1541+02	.6453+01	.7571+03	.4439-13	.7571+03	.5714+03	.3359-14	-.1294+01	.7627+00	.7658	.6803
202	.1637+02	.6453+01	.7565+03	.4444-13	.7565+03	.5714+03	.3366-14	-.1374+01	.7619+00	.7658	.6808
203	.1738+02	.6453+01	.7559+03	.4446-13	.7559+03	.5714+03	.3370-14	-.1458+01	.7613+00	.7658	.6812
204	.1838+02	.6453+01	.7555+03	.4446-13	.7555+03	.5714+03	.3372-14	-.1542+01	.7608+00	.7658	.6815
205	.1939+02	.6453+01	.7551+03	.4444-13	.7551+03	.5714+03	.3372-14	-.1625+01	.7604+00	.7658	.6818
206	.2040+02	.6453+01	.7549+03	.4438-13	.7549+03	.5714+03	.3369-14	-.1709+01	.7602+00	.7658	.6820
207	.2140+02	.6453+01	.7547+03	.4430-13	.7547+03	.5714+03	.3363-14	-.1793+01	.7600+00	.7658	.6821
208	.2241+02	.6453+01	.7547+03	.4420-13	.7547+03	.5714+03	.3355-14	-.1876+01	.7600+00	.7658	.6821
209	.2342+02	.6453+01	.7547+03	.4406-13	.7547+03	.5714+03	.3344-14	-.1960+01	.7600+00	.7658	.6821
210	.2442+02	.6453+01	.7549+03	.4388-13	.7549+03	.5714+03	.3330-14	-.2044+01	.7602+00	.7658	.6819
211	.2543+02	.6453+01	.7552+03	.4366-13	.7552+03	.5714+03	.3312-14	-.2127+01	.7605+00	.7658	.6817
212	.2644+02	.6453+01	.7556+03	.4339-13	.7556+03	.5714+03	.3290-14	-.2211+01	.7610+00	.7658	.6814
213	.2744+02	.6453+01	.7562+03	.4306-13	.7562+03	.5714+03	.3262-14	-.2295+01	.7617+00	.7658	.6810
214	.2845+02	.6453+01	.7571+03	.4265-13	.7571+03	.5714+03	.3228-14	-.2378+01	.7626+00	.7658	.6804
215	.2946+02	.6453+01	.7582+03	.4216-13	.7582+03	.5714+03	.3186-14	-.2462+01	.7640+00	.7658	.6795
216	.3045+02	.6453+01	.7599+03	.4154-13	.7599+03	.5714+03	.3132-14	-.2546+01	.7659+00	.7658	.6783
217	.3147+02	.6453+01	.7624+03	.4077-13	.7624+03	.5714+03	.3064-14	-.2629+01	.7686+00	.7658	.6755
218	.3248+02	.6453+01	.7662+03	.3977-13	.7662+03	.5714+03	.2974-14	-.2713+01	.7729+00	.7658	.6737
219	.3348+02	.6453+01	.7728+03	.3845-13	.7728+03	.5714+03	.2851-14	-.2797+01	.7804+00	.7658	.6688
220	.3449+02	.6453+01	.7867+03	.3659-13	.7867+03	.5714+03	.2655-14	-.2880+01	.7962+00	.7658	.6585
221	.3550+02	.6453+01	.8209+03	.3359-13	.8209+03	.5714+03	.2344-14	-.2964+01	.8355+00	.7658	.6329

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SOLUTION COMBINATION - COMBYN RELEASE 2-0

DATE 062377

OFF-BODY POINTS (TRAJECT)

COORDINATES			VELOCITIES						PRESS. RATIO		
AXIAL	RADIAL	Y	AXIAL	RADIAL	CIRCUMFRNTL	RESULTANT	MERIDIONAL	CHORDWISE	SPANWISE	COMP	PSOPTC
I	X	Y	VX	VY	VZ	VRES	VM	VAFI	VSPAN	RHOBR	PSOPTC
	-5.3000-01	0.0000	5.9163+02	0.0000	0.0000	5.9163+02	0.0000	0.0000	0.0000	0.0000	.7944
1	-5.0000-01	3.0000	5.9163+02	-5.1903-07	1.6498-14	5.9163+02	5.9163+02	5.1903-07	-1.5468-14	.9014	.7944
2	-5.0000-01	7.2222-01	5.9108+02	-2.6467+00	1.6536-14	5.9108+02	5.9108+02	2.6467+00	-1.6301-07	.9014	.7948
3	-5.0000-01	1.4444+00	5.8918+02	-5.7852+00	1.6648-14	5.8921+02	5.8921+02	5.7862+00	-3.5636-07	.9014	.7960
4	-5.0000-01	2.1667+00	5.8512+02	-9.9601+00	1.6849-14	5.8521+02	5.8521+02	9.9601+00	-6.1343-07	.9014	.7985
5	-5.0000-01	2.8889+00	5.7700+02	-1.5744+01	1.7156-14	5.7721+02	5.7721+02	1.5744+01	-9.6968-07	.9014	.8036
6	-5.0000-01	3.6111+00	5.6035+02	-2.3313+01	1.7643-14	5.6084+02	5.6084+02	2.3313+01	-1.4358-06	.9014	.8138
7	-5.0000-01	4.3333+00	5.2445+02	-2.9416+01	1.8364-14	5.2527+02	5.2527+02	2.9416+01	-1.8117-06	.9014	.8352
8	-5.0000-01	5.0556+00	4.4885+02	-8.4441+00	1.9520-14	4.4893+02	4.4893+02	8.4441+00	-5.2006-07	.9014	.8775
9	-5.0000-01	5.7778+00	4.1327+02	-1.3327+02	2.1790-14	4.3422+02	4.3422+02	-1.3327+02	8.2082-06	.9014	.8851
10	-5.0000-01	5.5000+00	5.7650+02	1.7265+02	2.4225-14	6.0179+02	6.0179+02	-1.7265+02	1.0633-05	.9014	.7879
	-5.0000-01	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	.0000
	0.0000	0.0000	5.9607+02	0.0000	0.0000	5.9607+02	0.0000	0.0000	0.0000	0.0000	.7916
11	0.0000	0.0000	5.9607+02	-4.7963-07	1.5246-14	5.9607+02	5.9607+02	4.7963-07	-1.4294-14	.9014	.7916
12	0.0000	5.1111-01	5.9590+02	-2.6550+00	1.5267-14	5.9591+02	5.9591+02	2.6550+00	-1.6352-07	.9014	.7917
13	0.0000	1.2222+00	5.9531+02	-5.7610+00	1.5327-14	5.9534+02	5.9534+02	5.7610+00	-3.5481-07	.9014	.7921
14	0.0000	1.6333+00	5.9401+02	-9.8581+00	1.5435-14	5.9409+02	5.9409+02	9.8581+00	-6.0715-07	.9014	.7929
15	0.0000	2.4444+00	5.9137+02	-1.5707+01	1.5598-14	5.9158+02	5.9158+02	1.5707+01	-9.6737-07	.9014	.7945
16	0.0000	3.0556+00	5.8600+02	-2.4525+01	1.5835-14	5.8652+02	5.8652+02	2.4525+01	-1.5105-06	.9014	.7977
17	0.0000	3.6667+00	5.7466+02	-3.8451+01	1.6174-14	5.7595+02	5.7595+02	3.8451+01	-2.3661-06	.9014	.8044
18	0.0000	4.2778+00	5.4835+02	-5.1306+01	1.6672-14	5.5176+02	5.5176+02	6.1306+01	-3.7757-06	.9014	.8193
19	0.0000	4.8889+00	4.7610+02	-9.7428+01	1.7434-14	4.8596+02	4.8596+02	9.7428+01	-6.0005-06	.9014	.8576
20	0.0000	5.5000+00	2.0765+02	-8.7131+01	1.8558-14	2.2519+02	2.2519+02	8.7131+01	-5.3663-06	.9014	.9681
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	.0000
	5.0000-01	0.0000	6.3941+02	0.0000	0.0000	6.3941+02	0.0000	0.0000	0.0000	0.0000	.7631
21	5.0000-01	3.0000	6.3941+02	-4.6479-07	1.4774-14	6.3941+02	6.3941+02	4.6479-07	-1.3852-14	.8277	.7631
22	5.0000-01	5.6922-01	6.3954+02	-2.6647+00	1.4789-14	6.3955+02	6.3955+02	2.6647+00	-1.6412-07	.8277	.7630
23	5.0000-01	1.1384+00	6.3990+02	-5.7895+00	1.4819-14	6.3992+02	6.3992+02	5.7895+00	-3.5657-07	.8277	.7627
24	5.0000-01	1.7076+00	6.4041+02	-9.9269+00	1.4676-14	6.4049+02	6.4049+02	9.9269+00	-6.1138-07	.8277	.7624
25	5.0000-01	2.2759+00	6.4095+02	-1.5865+01	1.4961-14	6.4114+02	6.4114+02	1.5865+01	-9.7709-07	.8277	.7620
26	5.0000-01	2.8451+00	6.4124+02	-2.4906+01	1.5079-14	6.4172+02	6.4172+02	2.4906+01	-1.5340-06	.8277	.7616
27	5.0000-01	3.4153+00	6.4076+02	-3.9538+01	1.5240-14	6.4198+02	6.4198+02	3.9538+01	-2.4351-06	.8277	.7614
28	5.0000-01	3.9845+00	6.3832+02	-5.5299+01	1.5459-14	6.4166+02	6.4166+02	6.5299+01	-4.0217-06	.8277	.7616
29	5.0000-01	4.5537+00	6.3064+02	-1.1717+02	1.5770-14	6.4143+02	6.4143+02	1.1717+02	-7.2163-06	.8277	.7618
30	5.0000-01	5.1229+00	5.1097+02	-2.4960+02	1.6290-14	6.5999+02	6.5999+02	2.4960+02	-1.5372-05	.8277	.7492
	5.0000-01	5.2382+00	6.0886+02	-2.9971+02	1.6449-14	6.7863+02	6.7863+02	2.9971+02	-1.8459-05	.8277	.7364
	1.0000+00	3.0000	6.7044+02	0.0000	0.0000	6.7044+02	0.0000	0.0000	0.0000	0.0000	.7420
31	1.0000+00	0.0000	6.7044+02	-4.3410-07	1.3798-14	6.7044+02	6.7044+02	4.3410-07	-1.2937-14	.7837	.7420
32	1.0000+00	5.4730-01	6.7087+02	-2.2465+00	1.3803-14	6.7088+02	6.7088+02	2.2465+00	-1.3836-07	.7837	.7417
33	1.0000+00	1.0946+00	6.7221+02	-4.9127+00	1.3810-14	6.7223+02	6.7223+02	4.9127+00	-3.0257-07	.7837	.7408
34	1.0000+00	1.6419+00	6.7455+02	-8.4890+00	1.3823-14	6.7461+02	6.7461+02	8.4890+00	-5.2282-07	.7837	.7391
35	1.0000+00	2.1892+00	6.7814+02	-1.3641+01	1.3840-14	6.7828+02	6.7828+02	1.3641+01	-5.4018-07	.7837	.7366
36	1.0000+00	2.7355+00	6.8349+02	-2.1398+01	1.3860-14	6.8382+02	6.8382+02	2.1398+01	-1.3179-06	.7837	.7327
37	1.0000+00	3.2838+00	6.9183+02	-3.3550+01	1.3878-14	6.9265+02	6.9265+02	3.3550+01	-2.0663-06	.7837	.7266
38	1.0000+00	3.8311+00	7.0635+02	-5.3616+01	1.3891-14	7.0839+02	7.0839+02	5.3616+01	-3.3021-06	.7837	.7155
39	1.0000+00	4.3784+00	7.3657+02	-8.9575+01	1.3890-14	7.4200+02	7.4200+02	8.9575+01	-5.5168-06	.7837	.6913
40	1.0000+00	4.9257+00	8.1541+02	-1.6262+02	1.3878-14	8.3147+02	8.3147+02	1.6262+02	-1.0016-05	.7837	.6249
	1.0000+00	5.0660+00	8.5360+02	-1.9339+02	1.3873-14	8.7524+02	8.7524+02	1.9339+02	-1.1911-05	.7837	.5918
	1.5000+00	0.0000	6.9123+02	0.0000	0.0000	6.9123+02	0.0000	0.0000	0.0000	0.0000	.7276
41	1.5000+00	0.0000	6.9123+02	-3.9383-07	1.2518-14	6.9123+02	6.9123+02	3.9383-07	-1.1737-14	.7580	.7276
42	1.5000+00	5.3707-01	6.9196+02	-1.3861+00	1.2516-14	6.9196+02	6.9196+02	1.3861+00	-8.5369-08	.7580	.7271
43	1.5000+00	1.0741+00	6.9419+02	-3.1095+00	1.2499-14	6.9420+02	6.9420+02	3.1095+00	-1.9151-07	.7580	.7255

SOLUTION COMBINATION - COMSYN RELEASE 2-0

DATE 062377

44	1.5000+00	1.6112+00	6.9816+02	-5.5414+00	1.2472-14	6.9818+02	6.9818+02	5.5414+00	-3.4129-07	.7580	.7227
45	1.5000+00	2.1483+00	7.0430+02	-9.1318+00	1.2429-14	7.0436+02	7.0436+02	9.1318+00	-5.6242-07	.7580	.7183
46	1.5000+00	2.6854+00	7.1356+02	-1.4453+01	1.2362-14	7.1370+02	7.1370+02	1.4463+01	-8.9076-07	.7580	.7117
47	1.5000+00	3.2224+00	7.2781+02	-2.2294+01	1.2259-14	7.2815+02	7.2815+02	2.2294+01	-1.3731-06	.7580	.7013
48	1.5000+00	3.7595+00	7.5118+02	-3.3448+01	1.2101-14	7.5193+02	7.5193+02	3.3448+01	-2.0600-06	.7580	.6841
49	1.5000+00	4.2966+00	7.9353+02	-4.7697+01	1.1850-14	7.9496+02	7.9496+02	4.7697+01	-2.9376-06	.7580	.6524
50	1.5000+00	4.8336+00	8.8304+02	-5.6916+01	1.1432-14	8.8468+02	8.8468+02	5.6916+01	-3.5054-06	.7580	.5842
	1.5000+00	4.9958+00	9.3293+02	-5.3603+01	1.1270-14	9.3447+02	9.3447+02	5.3603+01	-3.3013-06		.5460
	1.6980+00	0.0000	5.9397+02	0.0000	0.0000	6.9397+02	0.0000	0.0000	0.0000		.7256
51	1.6980+00	0.0000	6.9397+02	-3.7478-07	1.1913-14	6.9397+02	6.9397+02	3.7478-07	-1.1169-14	.7556	.7256
52	1.6980+00	5.3550-01	6.9479+02	-9.2902-01	1.1907-14	6.9479+02	6.9479+02	9.2902-01	-5.7217-08	.7556	.7251
53	1.6980+00	1.0710+00	6.9732+02	-2.1543+00	1.1883-14	6.9732+02	6.9732+02	2.1543+00	-1.3268-07	.7556	.7233
54	1.6980+00	1.6065+00	7.0179+02	-3.9899+00	1.1841-14	7.0180+02	7.0180+02	3.9899+00	-2.4574-07	.7556	.7201
55	1.6980+00	2.1420+00	7.0870+02	-6.7886+00	1.1776-14	7.0873+02	7.0873+02	6.7886+00	-4.1810-07	.7556	.7152
56	1.6980+00	2.6775+00	7.1901+02	-1.0947+01	1.1578-14	7.1910+02	7.1910+02	1.0947+01	-6.7419-07	.7556	.7078
57	1.6980+00	3.2130+00	7.3460+02	-1.1534+01	1.1534-14	7.3479+02	7.3479+02	1.6839+01	-1.0371-06	.7556	.6966
58	1.6980+00	3.7485+00	7.5921+02	-2.4439+01	1.1320-14	7.5961+02	7.5961+02	2.4439+01	-1.5052-06	.7556	.6785
59	1.6980+00	4.2840+00	8.0059+02	-3.1515+01	1.0990-14	8.0121+02	8.0121+02	3.1515+01	-1.9410-06	.7556	.6477
60	1.6980+00	4.8195+00	8.7398+02	-2.3930+01	1.0454-14	8.7431+02	8.7431+02	2.3930+01	-1.4738-06	.7556	.5923
	1.6980+00	4.9907+00	9.1068+02	-9.1526+00	1.0219-14	9.1073+02	9.1073+02	9.1526+00	-5.6370-07		.5644
	2.6980+00	0.0000	6.8369+02	0.0000	0.0000	6.8369+02	0.0000	0.0000	0.0000		.7328
61	2.6980+00	0.0000	6.8369+02	-2.7682-07	8.7991-15	6.8369+02	6.8369+02	2.7682-07	-8.2499-15	.7673	.7328
62	2.6980+00	5.3549-01	6.8477+02	1.9994+00	8.7837-15	6.8478+02	6.8478+02	-1.9994+00	1.2314-07	.7673	.7321
63	2.6980+00	1.0610+00	6.8807+02	3.9021+00	8.7296-15	6.8808+02	6.8808+02	-3.9021+00	2.4033-07	.7673	.7296
64	2.6980+00	1.5915+00	6.9372+02	5.6557+00	8.6376-15	6.9374+02	6.9374+02	-5.6557+00	3.4833-07	.7673	.7258
65	2.6980+00	2.1220+00	7.0201+02	7.3033+00	8.5005-15	7.0205+02	7.0205+02	-7.3033+00	4.4980-07	.7673	.7199
66	2.6980+00	2.6524+00	7.1344+02	9.0690+00	8.3086-15	7.1349+02	7.1349+02	-9.0690+00	5.5855-07	.7673	.7118
67	2.6980+00	3.1829+00	7.2865+02	1.1505+01	8.0480-15	7.2874+02	7.2874+02	-1.1505+01	7.0855-07	.7673	.7009
68	2.6980+00	3.7134+00	7.4832+02	1.5726+01	7.6996-15	7.4849+02	7.4849+02	-1.5726+01	9.6857-07	.7673	.6866
69	2.6980+00	4.2439+00	7.7238+02	2.3596+01	7.2392-15	7.7274+02	7.7274+02	-2.3596+01	1.4533-06	.7673	.6688
70	2.6980+00	4.7744+00	7.9855+02	3.6943+01	6.6423-15	7.9940+02	7.9940+02	-3.6943+01	2.2753-06	.7673	.6490
	2.6980+00	5.0197+00	8.1018+02	4.4862+01	6.3166-15	8.1143+02	8.1143+02	-4.4862+01	2.7630-06		.6400
	3.6980+00	0.0000	6.5045+02	0.0000	0.0000	6.5045+02	0.0000	0.0000	0.0000		.7557
71	3.6980+00	0.0000	6.5045+02	-1.9479-07	6.1918-15	6.5045+02	6.5045+02	1.9479-07	-5.8053-15	.7934	.7557
72	3.6980+00	5.3948-01	6.5164+02	5.4007+00	6.1739-15	6.5166+02	6.5166+02	-5.4007+00	3.3262-07	.7934	.7549
73	3.6980+00	1.0790+00	6.5518+02	1.0723+01	6.1111-15	6.5527+02	6.5527+02	-1.0723+01	6.6045-07	.7934	.7524
74	3.6980+00	1.6184+00	6.6096+02	1.5971+01	6.0061-15	6.6116+02	6.6116+02	-1.5971+01	9.8362-07	.7934	.7484
75	3.6980+00	2.1579+00	6.6886+02	2.1287+01	5.8541-15	6.6920+02	6.6920+02	-2.1287+01	1.3111-06	.7934	.7429
76	3.6980+00	2.6974+00	5.7874+02	2.7001+01	5.6493-15	5.7928+02	5.7928+02	-2.7001+01	1.6630-06	.7934	.7359
77	3.6980+00	3.2359+00	6.9043+02	3.3634+01	5.3860-15	6.9125+02	6.9125+02	-3.3634+01	2.0715-06	.7934	.7276
78	3.6980+00	3.7763+00	7.0361+02	4.1858+01	5.0587-15	7.0466+02	7.0466+02	-4.1858+01	2.5760-06	.7934	.7180
79	3.6980+00	4.3158+00	7.1774+02	5.2364+01	4.6640-15	7.1964+02	7.1964+02	-5.2364+01	3.2250-06	.7934	.7074
80	3.6980+00	4.8553+00	7.3204+02	6.5651+01	4.2038-15	7.3497+02	7.3497+02	-6.5651+01	4.0434-06	.7934	.6964
	3.6980+00	5.0976+00	7.3633+02	7.2639+01	3.9779-15	7.4190+02	7.4190+02	-7.2639+01	4.4738-06		.6914
	1.1600+01	2.3972+00	6.1822+02	4.7135+00	1.1515-15	6.1824+02	6.1824+02	-4.7135+00	2.9030-07		.7772
81	1.1600+01	2.6458+00	6.0304+02	2.1175+01	1.0454-15	6.0342+02	6.0342+02	-2.1175+01	1.3042-06	.8696	.7869
82	1.1600+01	2.9905+00	5.8536+02	2.9186+01	9.3967-16	5.8609+02	5.8609+02	-2.9186+01	1.7976-06	.8696	.7980
83	1.1600+01	3.3351+00	5.7167+02	3.1038+01	9.6570-16	5.7257+02	5.7257+02	-3.1038+01	1.9116-06	.8696	.8065
84	1.1600+01	3.6798+00	5.6076+02	3.0279+01	8.1193-16	5.6158+02	5.6158+02	-3.0279+01	1.8649-06	.8696	.8133
85	1.1600+01	4.0245+00	5.5179+02	2.8254+01	7.7147-16	5.5251+02	5.5251+02	-2.8254+01	1.7401-06	.8696	.8189
86	1.1600+01	4.3591+00	5.4416+02	2.5519+01	7.4049-16	5.4475+02	5.4475+02	-2.5519+01	1.5717-06	.8696	.8236
87	1.1600+01	4.7138+00	5.3743+02	2.2270+01	7.1652-16	5.3789+02	5.3789+02	-2.2270+01	1.3716-06	.8696	.8277
88	1.1600+01	5.0595+00	5.3129+02	1.8485+01	6.9825-16	5.3161+02	5.3161+02	-1.8485+01	1.1384-06	.8696	.8314
89	1.1600+01	5.4031+00	5.2546+02	1.3931+01	6.8465-16	5.2565+02	5.2565+02	-1.3931+01	8.5801-07	.8696	.8349
90	1.1600+01	5.7478+00	5.1970+02	7.9568+00	5.7564-16	5.1976+02	5.1976+02	-7.9568+00	4.9005-07	.8696	.8384
	1.1600+01	6.0000+00	5.1505+02	1.5657+00	6.7333-16	5.1505+02	5.1505+02	-1.5657+00	9.6428-08		.8411

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SOLUTION COMBINATION - COMSYN RELEASE 2-D

DATE 062377

I	COORDINATES		NEW CP	ANGLES						
	AXIAL	RADIAL		MERIDIONAL	FLOW	UNDERTURNG	SPANWISE	SWIRL		
	X	Y	VBRI	M	ALPHA	BETA	ETA	ZETA	PHI	OFRACT
1	-5.0000-01	0.0000	4.2634+02	5.8293-01	-5.0264-08	1.5977-15	0.0000	0.0000	0.0000	0.0000
2	-5.0000-01	7.2222-01	4.2634+02	5.8235-01	-2.5655-01	1.6029-15	2.5655-01	-1.5801-08	1.6029-15	1.8213-02
3	-5.0000-01	1.4444+00	4.2634+02	5.8038-01	-5.6267-01	1.6189-15	5.6267-01	-3.4655-08	1.6189-15	7.2774-02
4	-5.0000-01	2.1657+00	4.2634+02	5.7618-01	-9.7521-01	1.6497-15	9.7521-01	-6.0068-08	1.6499-15	1.6339-01
5	-5.0000-01	2.8889+00	4.2634+02	5.6779-01	-1.5630+00	1.7039-15	1.5630+00	-9.6289-08	1.7045-15	2.8934-01
6	-5.0000-01	3.6111+00	4.2634+02	5.5069-01	-2.3823+00	1.8024-15	2.3823+00	-1.4661-07	1.8040-15	4.4882-01
7	-5.0000-01	4.3333+00	4.2634+02	5.1386-01	-3.2104+00	2.0035-15	3.2104+00	-1.9793-07	2.0067-15	6.3707-01
8	-5.0000-01	5.0556+00	4.2634+02	4.3608-01	-1.0778+00	2.4913-15	1.0778+00	-6.6386-08	2.4917-15	8.4143-01
9	-5.0000-01	5.7778+00	4.2634+02	4.2128-01	1.7874+01	2.8752-15	-1.7874+01	1.1380-06	3.0210-15	1.0554+00
10	-5.0000-01	5.5000+00	4.2634+02	5.9364-01	1.6672+01	2.3064-15	-1.6672+01	1.0562-06	2.4076-15	1.3243+00
11	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3243+00
12	0.0000	0.0000	4.2634+02	5.8760-01	-4.6103-08	1.4655-15	0.0000	0.0000	0.0000	0.0000
13	0.0000	6.1111-01	4.2634+02	5.8743-01	-2.5527-01	1.4679-15	2.5527-01	-1.5722-08	1.4679-15	1.3110-02
14	0.0000	1.2222+00	4.2634+02	5.8683-01	-5.5445-01	1.4751-15	5.5445-01	-3.4149-08	1.4752-15	5.2423-02
15	0.0000	1.8333+00	4.2634+02	5.8552-01	-9.5078-01	1.4886-15	9.5078-01	-5.8563-08	1.4888-15	1.1787-01
16	0.0000	2.4444+00	4.2634+02	5.8287-01	-1.5214+00	1.5107-15	1.5214+00	-9.3725-08	1.5113-15	2.0929-01
17	0.0000	3.0556+00	4.2634+02	5.7555-01	-2.3965+00	1.5469-15	2.3965+00	-1.4768-07	1.5482-15	3.2627-01
18	0.0000	3.6667+00	4.2634+02	5.6647-01	-3.8279+00	1.6090-15	3.8279+00	-2.3611-07	1.6126-15	4.6780-01
19	0.0000	4.2778+00	4.2634+02	5.4126-01	-5.3792+00	1.7313-15	6.3792+00	-3.9452-07	1.7421-15	6.3106-01
20	0.0000	4.8889+00	4.2634+02	4.7361-01	-1.1565+01	2.0155-15	1.1565+01	-7.2213-07	2.0981-15	8.0633-01
21	0.0000	5.5000+00	4.2634+02	2.1570-01	-2.2763+01	4.7218-15	2.2763+01	-1.4807-06	5.1206-15	9.4252-01
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9.4252-01
23	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
24	5.0000-01	0.0000	5.2396+02	6.3364-01	-4.1648-08	1.3239-15	4.1648-08	-1.2412-15	1.3239-15	0.0000
25	5.0000-01	5.6922-01	5.2396+02	6.3378-01	-2.3873-01	1.3249-15	2.3873-01	-1.4703-08	1.3249-15	1.1950-02
26	5.0000-01	1.1354+00	5.2396+02	6.3418-01	-5.1837-01	1.3268-15	5.1837-01	-3.1927-08	1.3269-15	4.7808-02
27	5.0000-01	1.7076+00	5.2396+02	6.3479-01	-6.8806-01	1.3308-15	6.8806-01	-5.4699-08	1.3309-15	1.0759-01
28	5.0000-01	2.2759+00	5.2396+02	6.3549-01	-1.4179+00	1.3370-15	1.4179+00	-8.7345-08	1.3374-15	1.9133-01
29	5.0000-01	2.8451+00	5.2396+02	6.3611-01	-2.2243+00	1.3463-15	2.2243+00	-1.3706-07	1.3474-15	2.9901-01
30	5.0000-01	3.4153+00	5.2396+02	6.3638-01	-3.5309+00	1.3601-15	3.5309+00	-2.1774-07	1.3627-15	4.3057-01
31	5.0000-01	3.9845+00	5.2396+02	6.3604-01	-5.8408+00	1.3604-15	5.8408+00	-3.6098-07	1.3876-15	5.8568-01
32	5.0000-01	4.5537+00	5.2396+02	6.3580-01	-1.0525+01	1.4267-15	1.0525+01	-6.5562-07	1.4328-15	7.6322-01
33	5.0000-01	5.1229+00	5.2396+02	6.5575-01	-2.2221+01	1.4142-15	2.2221+01	-1.4416-06	1.5276-15	9.5879-01
34	5.0000-01	5.7352+00	5.2396+02	6.7594-01	-2.6209+01	1.3888-15	2.6209+01	-1.7370-06	1.5479-15	1.0000+00
35	1.0000+00	0.0000	0.0000	6.6705-01	-3.7098-08	1.1792-15	0.0000	0.0000	0.0000	0.0000
36	1.0000+00	0.0000	5.6022+02	6.6705-01	-3.7098-08	1.1792-15	3.7098-08	-1.1056-15	1.1792-15	0.0000
37	1.0000+00	5.4730-01	5.6022+02	6.6752-01	-1.9186-01	1.1788-15	1.9186-01	-1.1617-08	1.1788-15	1.1342-02
38	1.0000+00	1.0946+00	5.6022+02	6.6899-01	-4.1873-01	1.1771-15	4.1873-01	-2.5789-08	1.1771-15	4.5394-02
39	1.0000+00	1.6419+00	5.6022+02	6.7157-01	-7.2100-01	1.1740-15	7.2100-01	-4.4402-08	1.1741-15	1.0223-01
40	1.0000+00	2.1892+00	5.6022+02	6.7555-01	-1.1524+00	1.1691-15	1.1524+00	-7.0983-08	1.1693-15	1.8199-01
41	1.0000+00	2.7365+00	5.6022+02	6.8159-01	-1.7932+00	1.1613-15	1.7932+00	-1.1042-07	1.1618-15	2.8491-01
42	1.0000+00	3.2838+00	5.6022+02	6.9122-01	-2.7763+00	1.1480-15	2.7763+00	-1.7113-07	1.1494-15	4.1134-01
43	1.0000+00	3.8311+00	5.6022+02	7.0848-01	-4.3407+00	1.1235-15	4.3407+00	-2.6785-07	1.1267-15	5.6196-01
44	1.0000+00	4.3754+00	5.6022+02	7.4575-01	-6.9337+00	1.0726-15	6.9337+00	-4.2913-07	1.0805-15	7.3817-01
45	1.0000+00	4.9257+00	5.6022+02	8.4781-01	-1.1279+01	9.5626-16	1.1279+01	-7.0377-07	9.7512-16	9.4270-01
46	1.0000+00	5.0650+00	0.0000	6.9945-01	-1.2766+01	9.0817-16	1.2766+01	-7.9949-07	9.3119-16	1.0000+00
47	1.5000+00	0.0000	0.0000	6.8967-01	-3.2644-08	1.0376-15	0.0000	0.0000	0.0000	0.0000
48	1.5000+00	0.0000	5.7578+02	6.8967-01	-3.2644-08	1.0376-15	3.2644-08	-9.7286-16	1.0376-15	0.0000
49	1.5000+00	5.3707-01	5.7578+02	6.9047-01	-1.1477-01	1.0364-15	1.1477-01	-7.0688-09	1.0364-15	1.1110-02
50	1.5000+00	1.0741+00	5.7578+02	6.9292-01	-2.5664-01	1.0316-15	2.5664-01	-1.5806-08	1.0316-15	4.4475-02

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SOLUTION COMBINATION - COBBYN RELEASE 2-0

DATE 062377

44	1.5000+00	1.6112+00	5.7578+02	5.9727-01	-4.5476-01	1.0235-15	4.5476-01	-2.8008-08	1.0235-15	1.0021-01
45	1.5000+00	2.1433+00	5.7578+02	7.0406-01	-7.4284-01	1.0110-15	7.4284-01	-4.5753-08	1.0111-15	1.7854-01
46	1.5000+00	2.8854+00	5.7578+02	7.1434-01	-1.1612+00	-7.9238-16	1.1612+00	-7.1525-08	9.9259-16	2.1977-01
47	1.5000+00	3.2224+00	5.7578+02	7.3032-01	-1.7546+00	9.6465-16	1.7546+00	-1.0809-07	9.6510-16	3.0454-01
48	1.5000+00	3.7595+00	5.7578+02	7.5686-01	-2.5496+00	9.2210-16	2.5496+00	-1.5713-07	9.2301-16	5.5370-01
49	1.5000+00	4.2966+00	5.7578+02	8.0562-01	-3.4398+00	8.5807-16	3.4398+00	-2.1211-07	8.5561-16	7.2686-01
50	1.5000+00	4.8336+00	5.7578+02	9.1099-01	-3.6879+00	7.4059-16	3.6879+00	-2.2745-07	7.4213-16	9.3233-01
	1.5000+00	4.9958+00		9.7138-01	-3.2884+00	6.9100-16	3.2884+00	-2.0275-07	6.9214-16	1.0000+00
	1.6980+00	0.0000		5.9256-01	-3.0943-08	9.8356-16	0.0000	0.0000	0.0000	0.0000
51	1.6980+00	0.0000	5.7710+02	8.9256-01	-3.0943-08	9.8356-16	3.0943-08	-9.2217-16	9.8356-16	0.0000
52	1.6980+00	5.3550-01	5.7710+02	6.9356-01	-7.5611-02	9.8191-16	7.5611-02	-4.7184-09	9.8191-16	1.1060-02
53	1.6980+00	1.0710+00	5.7710+02	6.9633-01	-1.7701-01	9.7633-16	1.7701-01	-1.0902-08	9.7633-16	3.4282-02
54	1.6980+00	1.6055+00	5.7710+02	7.0125-01	-3.2574-01	9.6670-16	3.2574-01	-2.0052-08	9.6572-16	9.9194-02
55	1.6980+00	2.1420+00	5.7710+02	7.0887-01	-3.4882-01	9.5197-16	3.4882-01	-3.3802-08	9.5201-16	1.7783-01
56	1.6980+00	2.6775+00	5.7710+02	7.2030-01	-3.7223-01	9.3049-16	3.7223-01	-5.3724-08	9.3050-16	2.7677-01
57	1.6980+00	3.2130+00	5.7710+02	7.3771-01	-1.3132+00	8.9940-16	1.3132+00	-3.0891-08	8.9964-16	3.0321-01
58	1.6980+00	3.7495+00	5.7710+02	7.6549-01	-1.8437+00	8.5381-16	1.8437+00	-1.1359-07	8.5426-16	5.5207-01
59	1.6980+00	4.2840+00	5.7710+02	8.1279-01	-2.2543+00	7.8589-16	2.2543+00	-1.3891-07	7.8649-16	7.2681-01
60	1.6980+00	4.8195+00	5.7710+02	8.9835-01	-1.5654+00	6.8510-16	1.5654+00	-9.6620-08	6.8535-16	9.2924-01
	1.6980+00	4.9907+00		9.4225-01	-5.7582-01	6.4288-16	5.7582-01	-3.5465-08	6.4291-16	1.0000+00
	2.6980+00	0.0000		6.8144-01	-2.3198-08	7.3740-16	0.0000	0.0000	0.0000	0.0000
61	2.6980+00	0.0000	5.7060+02	6.8144-01	-2.3198-08	7.3740-16	2.3198-08	-6.9137-16	7.3740-16	0.0000
62	2.6980+00	5.3044-01	5.7060+02	6.8253-01	-1.6729-01	7.3494-16	-1.6729-01	1.0303-08	7.3494-16	1.0745-02
63	2.6980+00	1.0610+00	5.7060+02	6.8623-01	3.2493-01	7.2691-16	-3.2493-01	2.0012-08	7.2692-16	4.3034-02
64	2.6980+00	1.5915+00	5.7060+02	6.9241-01	4.6711-01	7.1338-16	-4.6711-01	2.8769-08	7.1340-16	9.7035-02
65	2.6980+00	2.1220+00	5.7060+02	7.0152-01	5.9605-01	6.9374-16	-5.9605-01	3.6711-08	6.9378-16	1.7303-01
66	2.6980+00	2.6524+00	5.7060+02	7.1411-01	7.2829-01	6.6720-16	-7.2829-01	4.4857-08	6.6726-16	2.7143-01
67	2.6980+00	3.1829+00	5.7060+02	7.3098-01	9.0456-01	6.3276-16	-9.0456-01	5.5715-08	6.3284-16	3.9280-01
68	2.6980+00	3.7134+00	5.7060+02	7.5200-01	1.2039+00	5.8939-16	-1.2039+00	7.4159-08	5.8952-16	5.3781-01
69	2.6980+00	4.2439+00	5.7060+02	7.8033-01	1.7498+00	5.3676-16	-1.7498+00	1.0780-07	5.3701-16	7.0723-01
70	2.6980+00	4.7744+00	5.7060+02	8.1072-01	2.6487+00	4.7606-16	-2.6487+00	1.6325-07	4.7659-16	9.0161-01
	2.6980+00	5.0197+00		8.2455-01	3.1694+00	4.4603-16	-3.1694+00	1.9540-07	4.4671-16	1.0000+00
	3.6980+00	0.0000		6.4547-01	-1.7159-08	5.4541-16	0.0000	0.0000	0.0000	0.0000
71	3.6980+00	0.0000	5.5329+02	6.4547-01	-1.7159-08	5.4541-16	1.7159-08	-5.1137-16	5.4541-16	0.0000
72	3.6980+00	5.3948-01	5.5329+02	6.4678-01	4.7485-01	5.4283-16	-4.7485-01	2.9246-08	5.4285-16	1.0805-02
73	3.6980+00	1.0790+00	5.5329+02	6.5066-01	9.3769-01	5.3434-16	-9.3769-01	5.7756-08	5.3441-16	4.3286-02
74	3.6980+00	1.6184+00	5.5329+02	6.5701-01	1.3842+00	5.2049-16	-1.3842+00	8.5265-08	5.2064-16	9.7640-02
75	3.6980+00	2.1579+00	5.5329+02	6.6571-01	1.8229+00	5.0122-16	-1.8229+00	1.1231-07	5.0147-16	1.7417-01
76	3.6980+00	2.6974+00	5.5329+02	6.7664-01	2.2781+00	4.7651-16	-2.2781+00	1.4038-07	4.7688-16	2.7329-01
77	3.6980+00	3.2369+00	5.5329+02	6.8969-01	2.7889+00	4.4643-16	-2.7889+00	1.7190-07	4.4696-16	3.9545-01
78	3.6980+00	3.7753+00	5.5329+02	7.0460-01	3.4045+00	4.1121-16	-3.4045+00	2.0993-07	4.1193-16	5.4115-01
79	3.6980+00	4.3158+00	5.5329+02	7.2090-01	4.1727+00	3.7133-16	-4.1727+00	2.5745-07	3.7232-16	7.1084-01
80	3.6980+00	4.8553+00	5.5329+02	7.3791-01	5.1247+00	3.2771-16	-5.1247+00	3.1647-07	3.2903-16	9.0487-01
	3.6980+00	5.0976+00		7.4563-01	5.6189+00	3.0721-16	-5.6189+00	3.4717-07	3.0869-16	1.0000+00
	1.1600+01	2.3992+00		6.1106-01	4.3683-01	1.0672-16	-4.3683-01	2.6904-08	1.0672-16	0.0000
81	1.1600+01	2.6458+00	4.7545+02	5.9535-01	2.0111+00	9.9263-17	-2.0111+00	1.2391-07	9.9324-17	4.4343-02
82	1.1600+01	2.9905+00	4.7545+02	5.7710-01	2.8544+00	9.1861-17	-2.8544+00	1.7595-07	9.1975-17	1.1234-01
83	1.1600+01	3.3351+00	4.7545+02	5.6298-01	3.1077+00	8.6637-17	-3.1077+00	1.9159-07	8.6765-17	1.8731-01
84	1.1600+01	3.6798+00	4.7545+02	5.5147-01	3.0908+00	8.2837-17	-3.0908+00	1.9054-07	8.2958-17	2.6925-01
85	1.1600+01	4.0245+00	4.7545+02	5.4203-01	2.9312+00	8.0002-17	-2.9312+00	1.8069-07	8.0107-17	3.5815-01
86	1.1600+01	4.3691+00	4.7545+02	5.3399-01	2.6851+00	7.7882-17	-2.6851+00	1.6549-07	7.7968-17	4.5400-01
87	1.1600+01	4.7138+00	4.7545+02	5.2688-01	2.3729+00	7.6323-17	-2.3729+00	1.4623-07	7.6388-17	5.5675-01
88	1.1600+01	5.0585+00	4.7545+02	5.2039-01	1.9926+00	7.5257-17	-1.9926+00	1.2277-07	7.5302-17	6.8635-01
89	1.1600+01	5.4031+00	4.7545+02	5.1425-01	1.5187+00	7.4627-17	-1.5187+00	9.3556-08	7.4653-17	7.8274-01
90	1.1600+01	5.7478+00	4.7545+02	5.0819-01	8.7715-01	7.4478-17	-8.7715-01	5.4027-08	7.4487-17	9.0581-01
	1.1600+01	5.0000+00		5.0335-01	1.7417-01	7.4902-17	-1.7417-01	1.0727-08	7.4903-17	1.0000+00

RELATIVE ROTOR INLET DATA

SOLUTION COMBINATION - COMBYN RELEASE 2-0

DATE 062377

X = 11.6000 U1IP = .0000

Y	U	VZPRIME	VPRIM	MPRIME	BETAPR	VZPRST	VPRST	MPRS	BETAPR
2.3992+00	0.0000	1.1515-15	5.1824+02	5.1136-01	1.0672-16	-1.1515-15	6.1824+02	6.1106-01	-1.0672-16
2.6458+00	0.0000	1.0454-15	5.0342+02	5.9535-01	9.9263-17	-1.0454-15	6.0342+02	5.9535-01	-9.9263-17
2.9905+00	0.0000	9.3967-16	5.8609+02	5.7710-01	9.1851-17	-9.3967-16	5.8609+02	5.7710-01	-9.1851-17
3.3351+00	0.0000	8.6570-16	5.7252+02	5.6288-01	8.6637-17	-8.6570-16	5.7252+02	5.6288-01	-8.6637-17
3.6798+00	0.0000	8.1193-16	5.6158+02	5.5147-01	8.2837-17	-8.1193-16	5.6158+02	5.5147-01	-8.2837-17
4.0245+00	0.0000	7.7147-16	5.5251+02	5.4203-01	8.0002-17	-7.7147-16	5.5251+02	5.4203-01	-8.0002-17
4.3691+00	0.0000	7.4049-16	5.4475+02	5.3399-01	7.7882-17	-7.4049-16	5.4475+02	5.3399-01	-7.7882-17
4.7138+00	0.0000	7.1652-16	5.3789+02	5.2668-01	7.6323-17	-7.1652-16	5.3789+02	5.2668-01	-7.6323-17
5.0585+00	0.0000	6.9825-16	5.3161+02	5.2039-01	7.5257-17	-6.9825-16	5.3161+02	5.2039-01	-7.5257-17
5.4031+00	0.0000	6.8465-16	5.2555+02	5.1425-01	7.4627-17	-6.8465-16	5.2555+02	5.1425-01	-7.4627-17
5.7478+00	0.0000	6.7564-16	5.1976+02	5.0819-01	7.4478-17	-6.7564-16	5.1976+02	5.0819-01	-7.4478-17
6.0000+00	0.0000	6.7333-16	5.1505+02	5.0335-01	7.4902-17	-6.7333-16	5.1505+02	5.0335-01	-7.4902-17

RAKE WEIGHT FLOW DATA

I	X	(Q(I)-QBAR)/QBAR	QS TOT	QFR	QSTOTCF/ARAKE	MBAR	QVALL	QSTOT/QVALL
1	-5.0000-01	3.2425-01	1.5534+01	1.0000+00				
2	0.0000	-5.7424-02	1.1656+01	1.0000+00				
3	5.0000-01	-5.0493-03	1.1672+01	1.0000+00	4.2410+01	6.2048-01	1.0963+01	1.0646+00
4	1.0000+00	-3.7901-03	1.1686+01	1.0000+00	4.5399+01	7.0838-01	1.2295+01	9.5047-01
5	1.5000+00	-4.0969-03	1.1683+01	1.0000+00	4.6651+01	7.5580-01	1.2346+01	9.4629-01
6	1.6980+00	-3.3770-03	1.1691+01	1.0000+00	4.6800+01	7.6215-01	1.2308+01	9.4986-01
7	2.6980+00	-9.2453-04	1.1720+01	1.0000+00	4.6373+01	7.4445-01	1.2120+01	9.6701-01
8	3.6980+00	-5.8740-04	1.1724+01	1.0000+00	4.4982+01	6.9440-01	1.2036+01	9.7405-01
9	1.1600+01	0.0000	1.1731+01	1.0000+00	3.8671+01	5.3533-01	1.1241+01	1.0436+00

STREAMLINES

X = -0.500

QSTRM	YSTRM
1.00000-01	1.66143+00
2.00000-01	2.37658+00
3.00000-01	2.93715+00
4.00000-01	3.39004+00
5.00000-01	3.60748+00
6.00000-01	4.19112+00
7.00000-01	4.55573+00
8.00000-01	4.90713+00
9.00000-01	5.25328+00
1.00000+00	5.59089+00

X = .000

QSTRM	YSTRM
1.00000-01	1.66646+00
2.00000-01	2.38234+00
3.00000-01	2.91832+00
4.00000-01	3.37391+00
5.00000-01	3.78719+00
6.00000-01	4.16150+00
7.00000-01	4.51815+00
8.00000-01	4.86683+00
9.00000-01	5.30922+00

X = .500

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SOLUTION COMBINATION - COMBYN RELEASE 2-0

DATE 062377

QSTRM	YSTRM
1.00000-01	1.63534+00
2.00000-01	2.32269+00
3.00000-01	2.85034+00
4.00000-01	3.28303+00
5.00000-01	3.67009+00
6.00000-01	4.03003+00
7.00000-01	4.35104+00
8.00000-01	4.65078+00
9.00000-01	4.95184+00
1.00000+00	5.23823+00

X = 1.000

QSTRM	YSTRM
1.00000-01	1.62041+00
2.00000-01	2.29495+00
3.00000-01	2.80183+00
4.00000-01	3.23472+00
5.00000-01	3.60595+00
6.00000-01	3.94924+00
7.00000-01	4.25983+00
8.00000-01	4.54383+00
9.00000-01	4.81143+00
1.00000+00	5.05604+00

X = 1.500

QSTRM	YSTRM
1.00000-01	1.60915+00
2.00000-01	2.25212+00
3.00000-01	2.77235+00
4.00000-01	3.20289+00
5.00000-01	3.55615+00
6.00000-01	3.90147+00
7.00000-01	4.20810+00
8.00000-01	4.48436+00
9.00000-01	4.74832+00
1.00000+00	4.99684+00

X = 1.398

QSTRM	YSTRM
1.00000-01	1.60790+00
2.00000-01	2.25959+00
3.00000-01	2.75884+00
4.00000-01	3.19919+00
5.00000-01	3.55118+00
6.00000-01	3.89538+00
7.00000-01	4.20183+00
8.00000-01	4.47760+00
9.00000-01	4.74214+00
1.00000+00	4.99068+00

X = 2.698

QSTRM	YSTRM
1.00000-01	1.61216+00
2.00000-01	2.25735+00
3.00000-01	2.77731+00
4.00000-01	3.20928+00

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SOLUTION COMBINATION - COMBYN RELEASE 2-D

DATE 062377

5.00000-01	3.57509+00
6.00000-01	3.92814+00
7.00000-01	4.22127+00
8.00000-01	4.49710+00
9.00000-01	4.77001+00
1.00000+00	5.01972+00

X = 3.698

QSTRM	YSTRM
1.00000-01	1.63506+00
2.00000-01	2.29847+00
3.00000-01	2.81534+00
4.00000-01	3.25370+00
5.00000-01	3.62397+00
6.00000-01	3.95343+00
7.00000-01	4.28135+00
8.00000-01	4.55372+00
9.00000-01	4.84176+00
1.00000+00	5.09763+00

X = 11.600

QSTRM	YSTRM
1.00000-01	2.92792+00
2.00000-01	3.39851+00
3.00000-01	3.79901+00
4.00000-01	4.17496+00
5.00000-01	4.52346+00
6.00000-01	4.84982+00
7.00000-01	5.15811+00
8.00000-01	5.45147+00
9.00000-01	5.73153+00
1.00000+00	6.03004+00

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SOLUTION COMBINATION = COMBYN RELEASE 2=0

DATE 062377

CASE -- BFUC1

YTESTH = 2.40000+00 YTESTS = 6.00000+00 YWING = 6.45000+00

VC = 5.45741+02 VINP = 7.46140+02 ALFAF = -1.57080+00 ITOTAL = 4.58180+02

RH0T = 6.90685-04 PA = 6.66421+02 PAC = 6.29415+02

HINF = 7.50375-01 MC = 5.36045-01

NTHETA = 2

SURFACE INTEGRALS

TOTAL	*****HUB*****			*****SHROUD*****			TOTAL (HUB AND SHROUD)		
	COMPRESS	INCOMPRESS	AREA	COMPRESS	INCOMPRESS	AREA	COMPRESS	INCOMPRESS	AREA
FORCE	-3.0671+01	-1.7666+01	3.5144+01	-1.0654+02	2.6799+01	3.6032+00	-1.3721+02	9.1330+00	3.9546+00
LIFT									
FORCE	-1.4883+01	-1.0233+01	1.2566+01	2.2279+01	2.6802+01	1.2223+01	7.3959+00	1.6569+01	2.4789+01
MOMENT	0.0000	0.0000		3.9636-07	3.9636-07		3.9636-07	3.9636-07	
MOM.ARM	0.0000	0.0000		2.1349-07	1.7746-07		6.4309-07	2.8705-07	
DRAW									
FORCE	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	
MOMENT	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	
MOM.ARM	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	
RESULTANTS									
	ANGLE OF ATTACK = -9.00000+01 FOR LIFT AND DRAW								
MOMENT	0.0000	0.0000		3.9636-07	3.9636-07		3.9636-07	3.9636-07	
LIFT	-2.3654-07	-1.6264-07		3.5409-07	4.2598-07		1.1755-07	2.6334-07	
DRAW	1.4883+01	1.0233+01		-2.2279+01	-2.6802+01		-7.3959+00	-1.6569+01	
FORCE	1.4883+01	1.0233+01		2.2279+01	2.6802+01		7.3959+00	1.6569+01	

MEASURING STATION INTEGRALS X = 1.16000+01

	AREA	FORCE DUE TO PRESS.	WEIGHT FLOW	MOMENTUM FLUX	MOMENT OF MOMENTUM FLX	DRAW FLUX	AVERAGE VAFT
IN	6.59827-01	INCOMP	-5.6074+01	1.0344+01	1.7621+02	0.0000	0.0000
EXACT	6.59827-01	COMP	-8.0491+01	1.1731+01	1.9971+02	0.0000	0.0000

VINF/VC = 1.3647+00 (VINF-VAFTAV)/VC = 1.3647+00 (VINF-VAFTAC)/VC = 1.3647+00

D/L = -5.2920+07 DC/LC = -6.2920+07

MISALIGNMENT PARAMETERS

DELV = 0.00000 DELVC = 0.00000 DELH = 0.00000 DELHC = 0.00000

COMPARISONS

MFLXP = -3.95044+01 DMFLX = 2.15715+02 PCDMF = 1.22419+00 PC02L = 1.00000+00
MFLXP = -7.30953+01 DMFLX = 2.72803+02 PCDMF = 1.36601+00 PC02L = 1.00000+00

LIFT = 3.6848-05 LIFTC = 4.4475-06 DRAWP = 8.0306+00 DRAWPC = -7.7897+00 DRAW = 8.0306+00 DRAWC = -7.7897+00

-413-

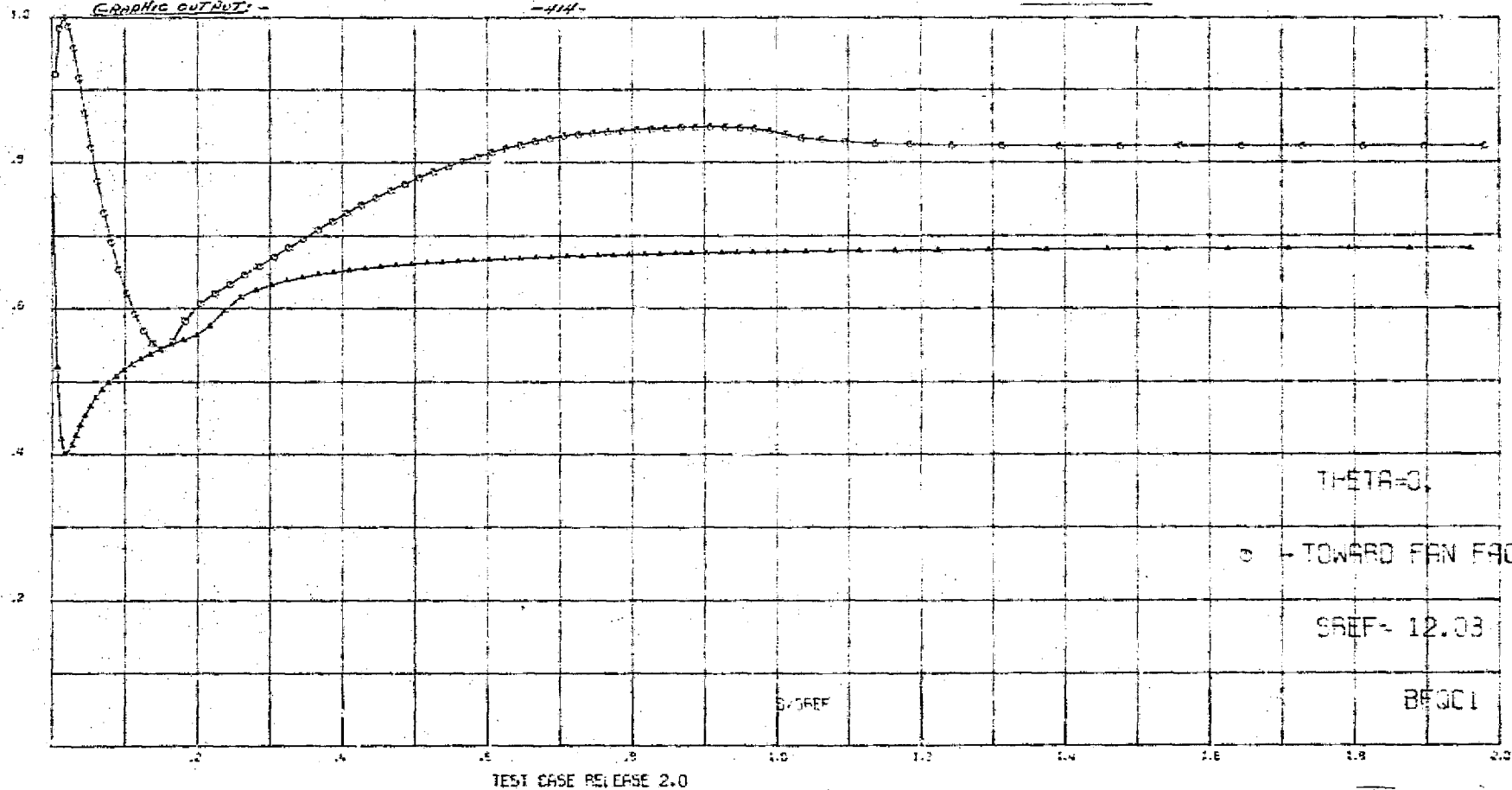
SOLUTION COMBINATION - COMBYN RELEASE 2-D

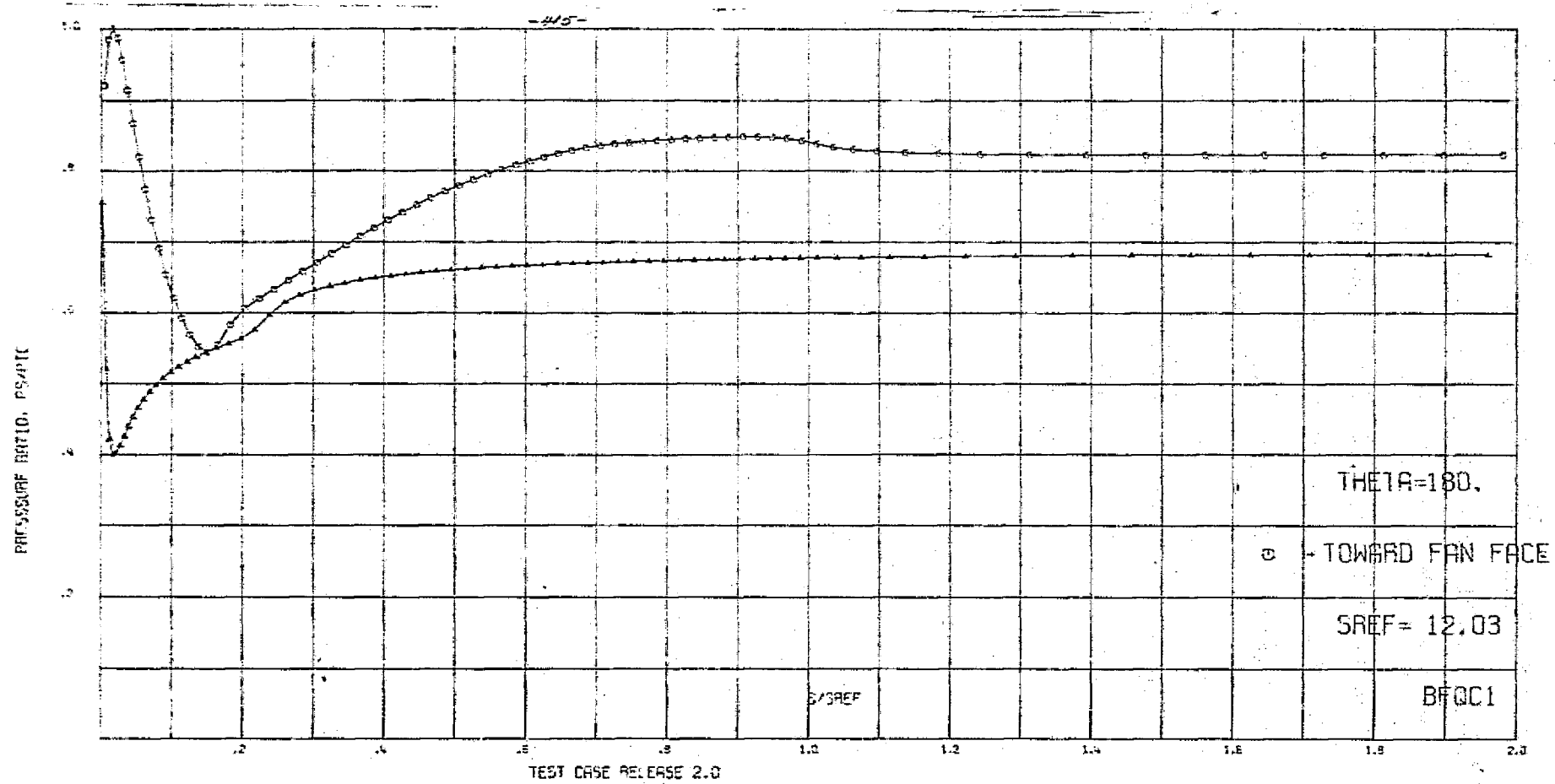
DATE 062377

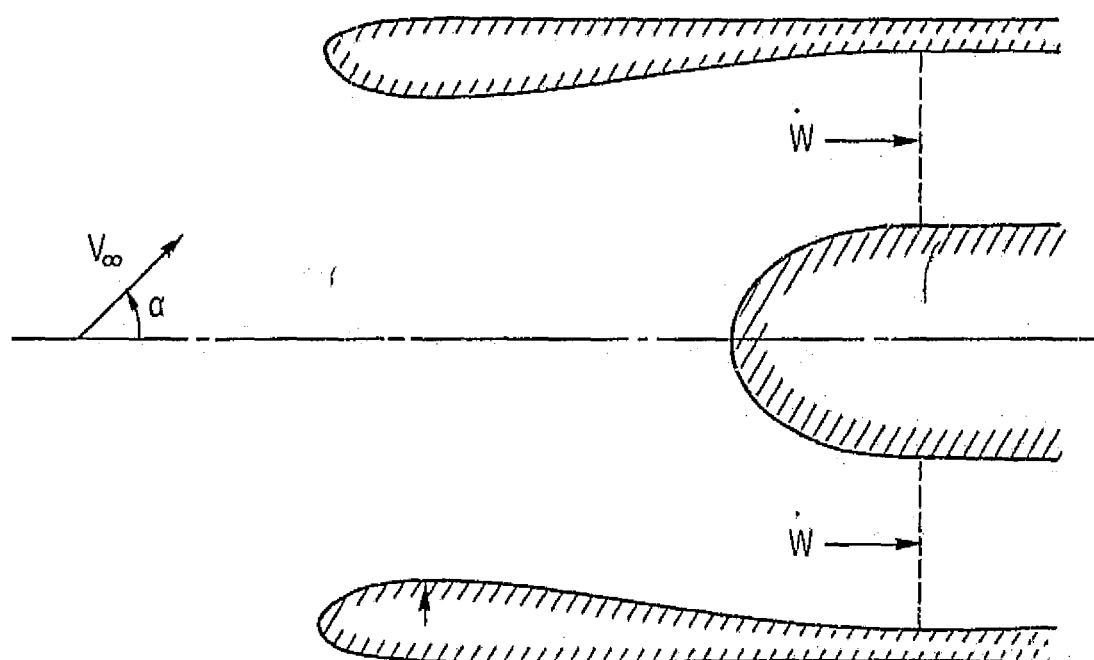
8FIN

GRAPHIC OUTPUT: -

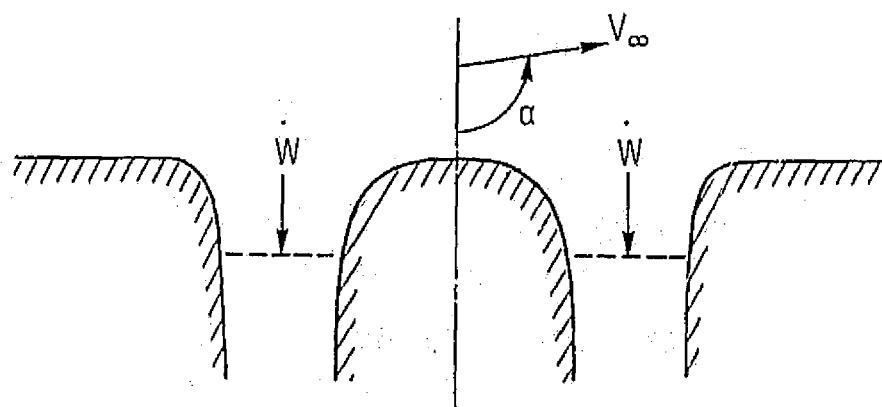
-414-





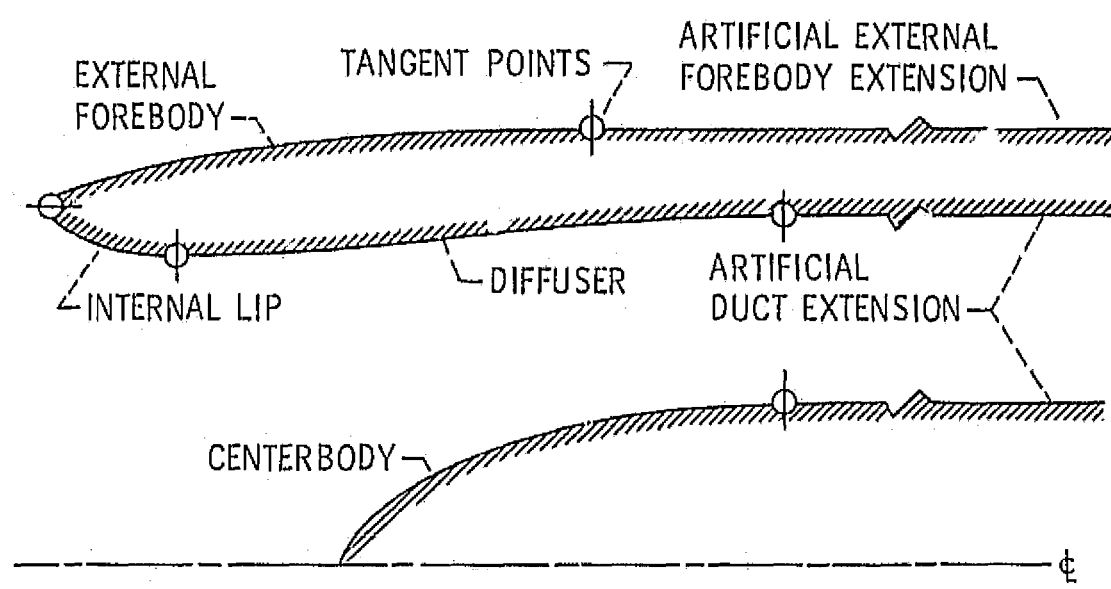


(a) CTOL OR STOL ENGINE INLET.

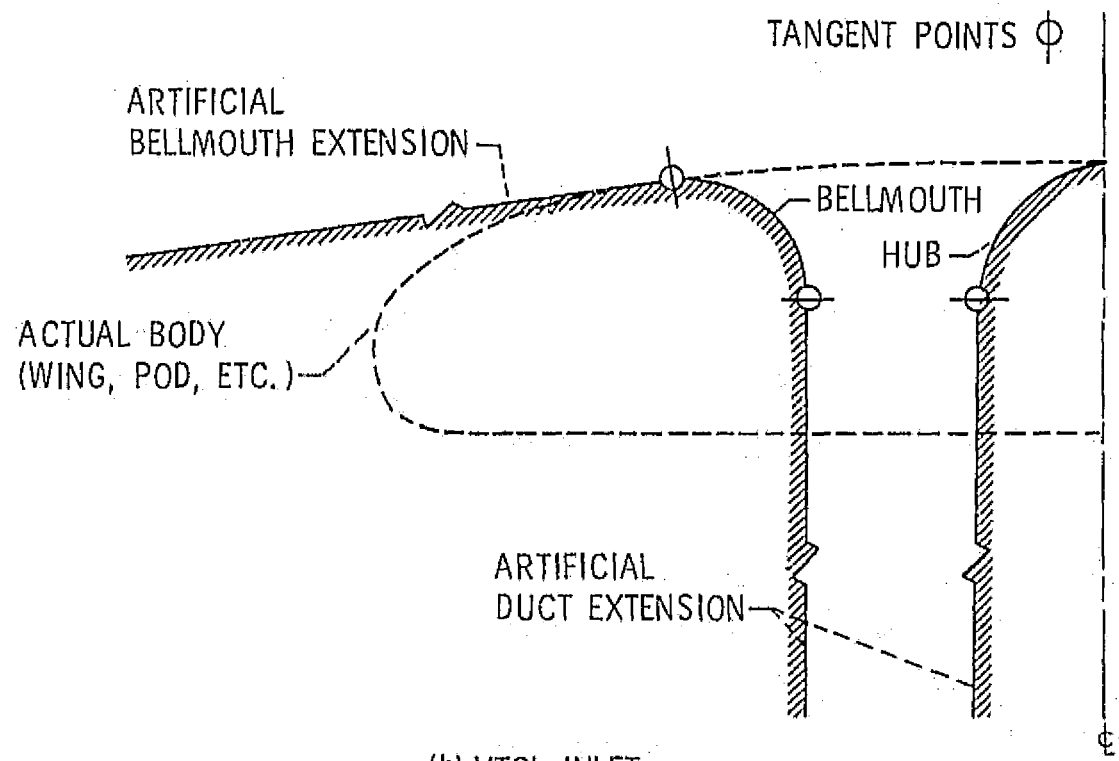


(b) VTOL ENGINE INLET.

Figure 1. - Inlet geometry and flow conditions for combined solution: inlet mass flow rate, $\dot{W}$; free stream velocity, V_{∞} ; and inlet incidence angle, α .



(a) CONVENTIONAL INLET.



(b) VTOL INLET.

Figure 2. - Representative inlet geometries for potential flow solutions.

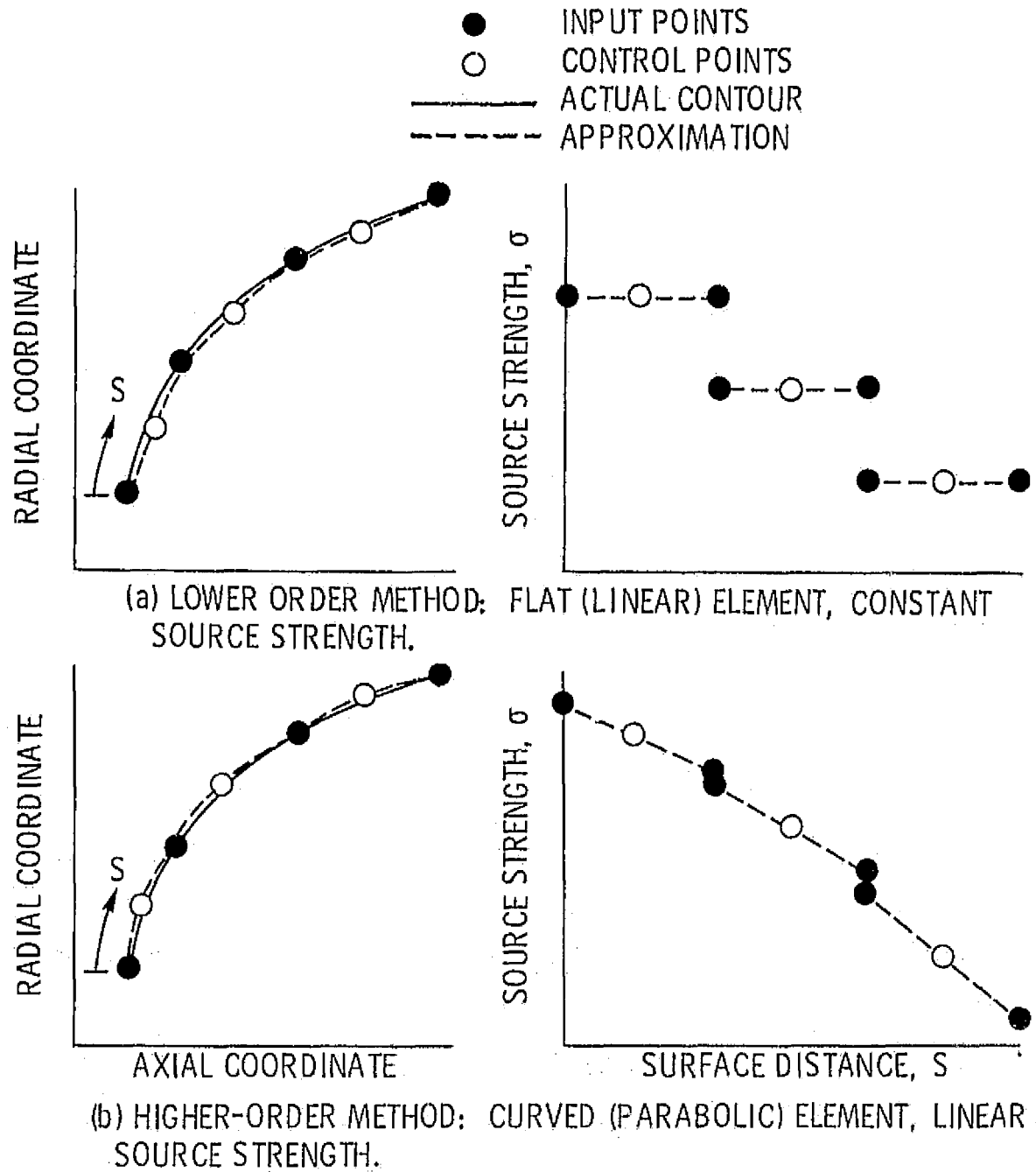


Figure 3. - Methods of approximating body surface contours and element source variation for basic solutions.

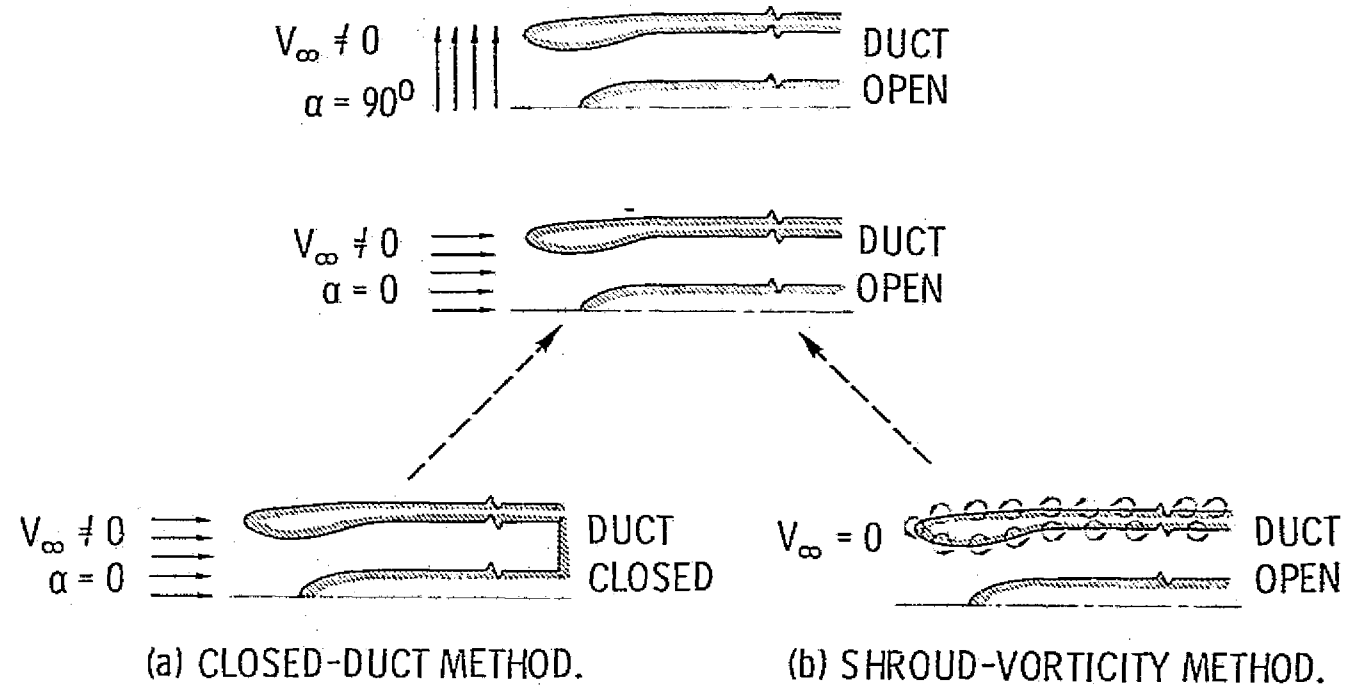


Figure 4. - Types of basic solutions considered.

- 4/23 -

AT ANY POINT, $\bar{V} = A\bar{V}_1 + B\bar{V}_2 + C\bar{V}_3$

A, B, AND C ARE DETERMINED BY
SPECIFYING VALUES OF:

- V_c AVERAGE AXIAL VELOCITY
AT CONTROL STATION
- V_∞ MAGNITUDE OF FREE STREAM
VELOCITY
- α DIRECTION OF FREE STREAM
VELOCITY RELATIVE TO
THE INLET AXIS

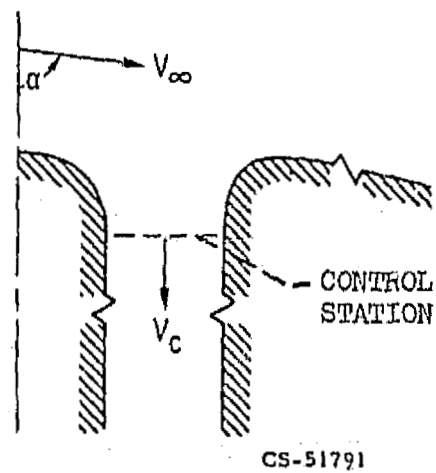
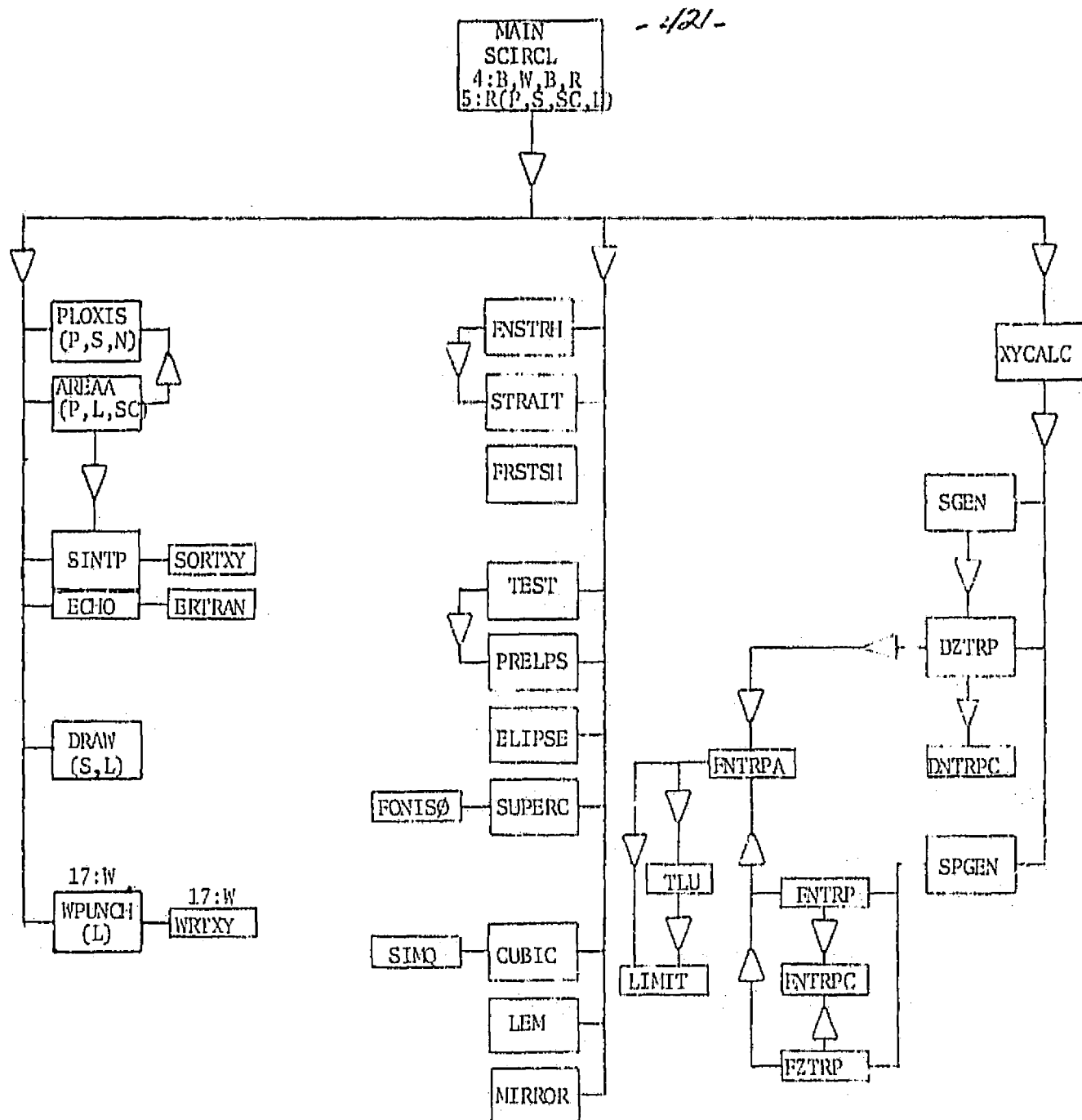


Figure 5. - Combined solution, $\bar{V}$.



a) SCIRCL

5 - I/O Unit No.

B - Rewind

W - Write

R - Read

Calcomp Routines Referenced:

(L) - Line

(P) - Plot

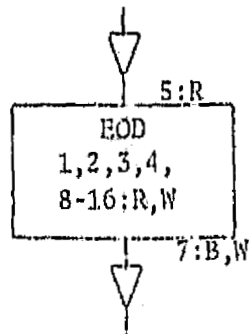
(S) - Symbol

(SC) - Scale

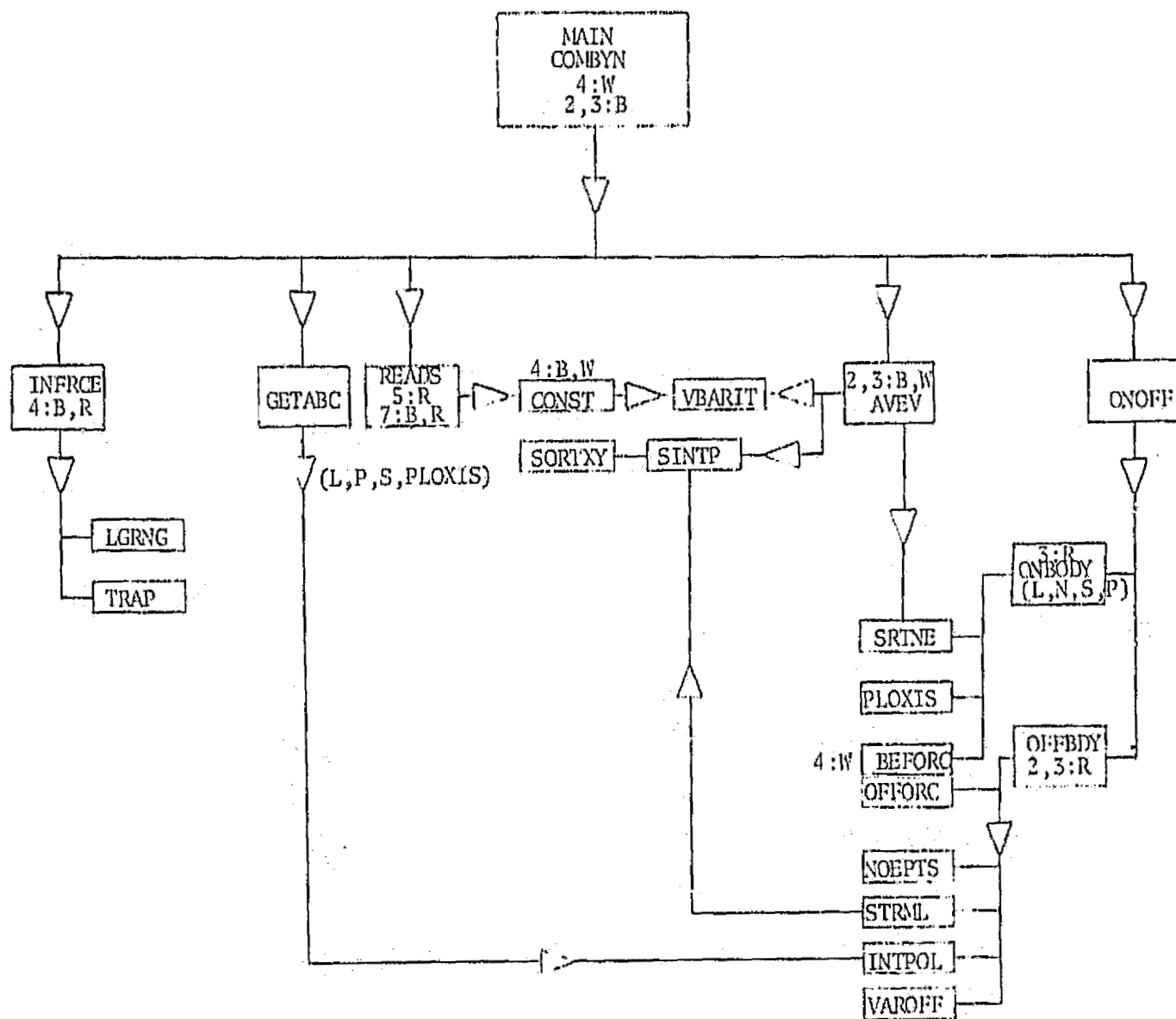
(N) - Number

Figure 6 - CALL SEQUENCES

- 422 -



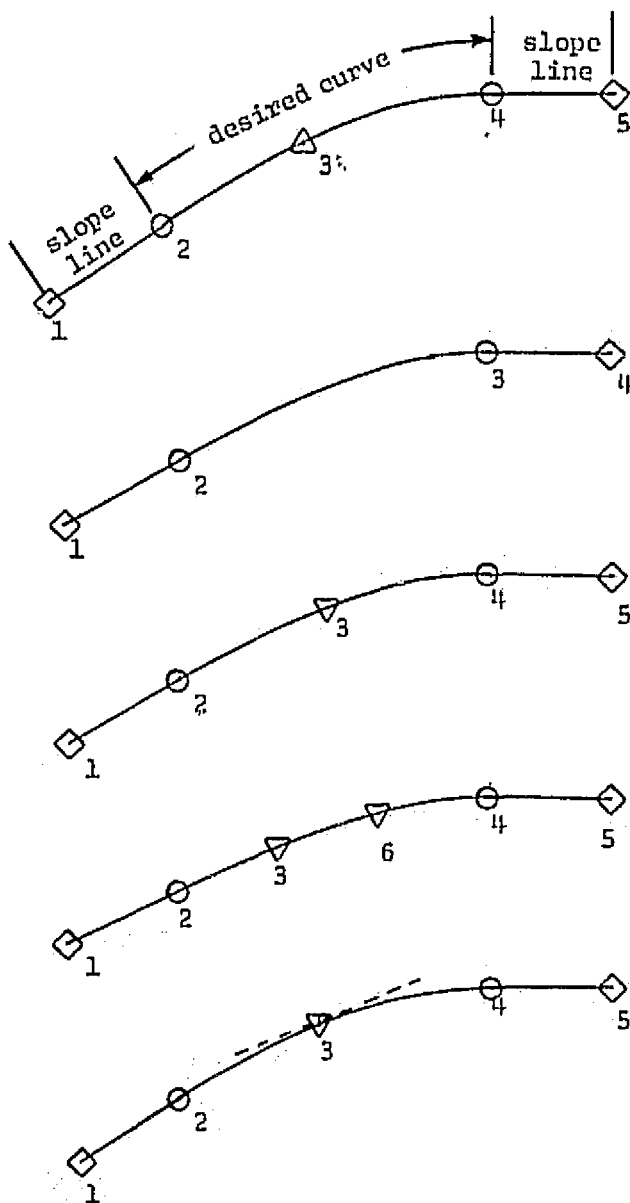
b) EOD



c) COMBYN

Figure 6 - (concluded)

- Segment endpoints
- ◇ Slope line endpoints (length of slope line is arbitrary)
- △ Optional superellipse point
- ▽ Optional bisuperellipse point
- ◁ Optional bisuperellipse inflection point



a) Superellipse optional point (X_3, Y_3) specified. Exponent N calculated.

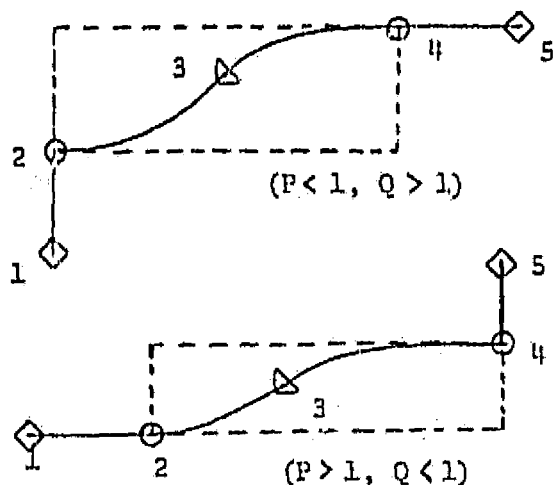
b) Superellipse exponent N or or bisuperellipse exponents P and Q specified.

c) Optional point (X_3, Y_3) and exponent P or Q specified. Exponent Q or P respectively calculated.

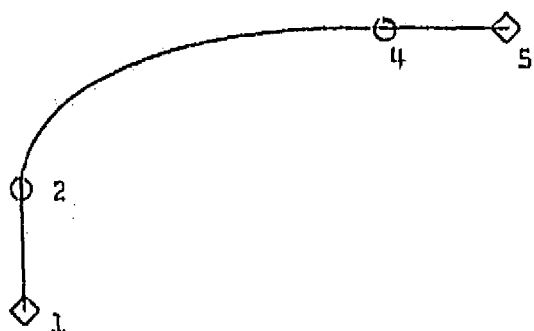
d) Optional points (X_3, Y_3) and (X_6, Y_6) specified. Exponents P and Q calculated.

e) Optional point (X_3, Y_3) and slope $(dy/dx)_3$. Exponents P and Q calculated.

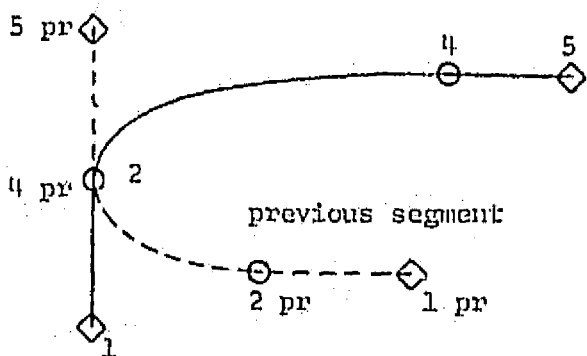
Figure 7. - Sketches for SCPRCL input. Bisuperellipse options.



f) Bisuperellipse with inflection point. Axial location X_3 and slope $(dy/dx)_3$ of inflection point are specified. Note that the slope line requirements for this option are different from all other options. One slope line must be perpendicular to curve and one must be tangent, thus there are two possibilities as shown. Both lines must lie away from and outside the 'box' surrounding the desired curve. Also, shown are the exponents that will result in each case.



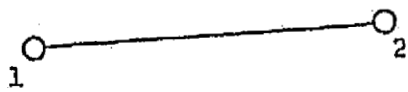
g) Curvature at either point 2 or point 4 specified.



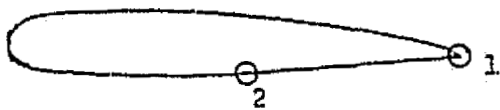
h) Curvature at endpoint 2 matched to internally calculated curvature at endpoint 4 pr of previous segment.

Figure 7. - Concluded.

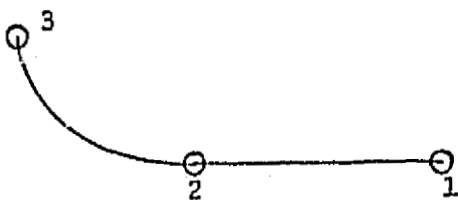
-4.25-



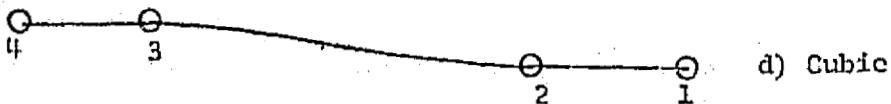
a) Straight line



b) Straight line for closed body



c) Lemniscate



d) Cubic

Figure 8. - Sketches for SCIRCL input options except bisuperellipse

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Figure 9. - SCIRCL input layout.

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Figure 10. - COMBYN input layout.